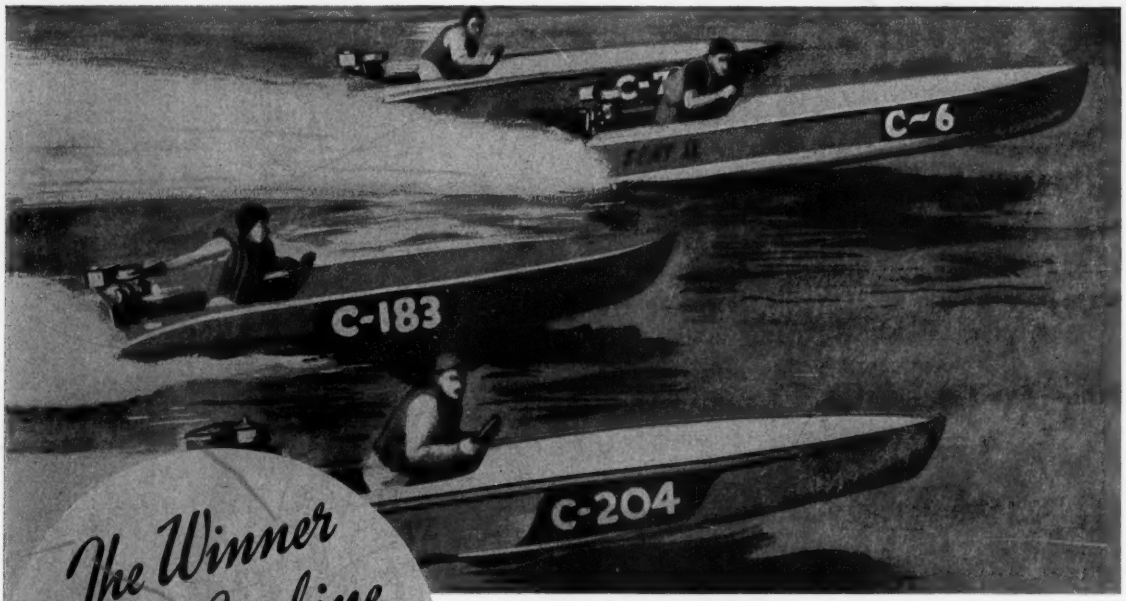
WIRE AND WIRE PRODUCTS

MARCH 1940



The Winner Must Combine Endurance with Speed

IN SPORT OR IN WIRE DRAWING PRODUCTION

Building for *speed* alone isn't enough—whether you are handling record-breaking boats or record-making VAUGHN Motoblocs and Motoblox.

You've got to construct the solid *endurance* that keeps safely in advance of the maximum pace of the machine—that assures reaching the finish line *every time* the race is run.

Especially at this time, it is reassuring to remember that VAUGHN Wire Drawing Machinery has a "factor of stamina" far higher than even its phenomenal ability to *produce*.

(Of course, if you are not one of the many already enjoying the unique advantages of our products, we suggest your asking us for further details—promptly!)

THE VAUGHN MACHINERY CO. · Cuyahoga Falls, Ohio, U. S. A.

COMPLETE WIRE DRAWING EQUIPMENT . . . CONTINUOUS OR SINGLE HOLE . . . FOR THE LARGEST BARS . . . FOR THE SMALLEST WIRE . . . FERROUS, NON-FERROUS MATERIALS OR THEIR ALLOYS

VAUGHN
WIRE DRAWING MACHINERY

OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION

New Wire Mill

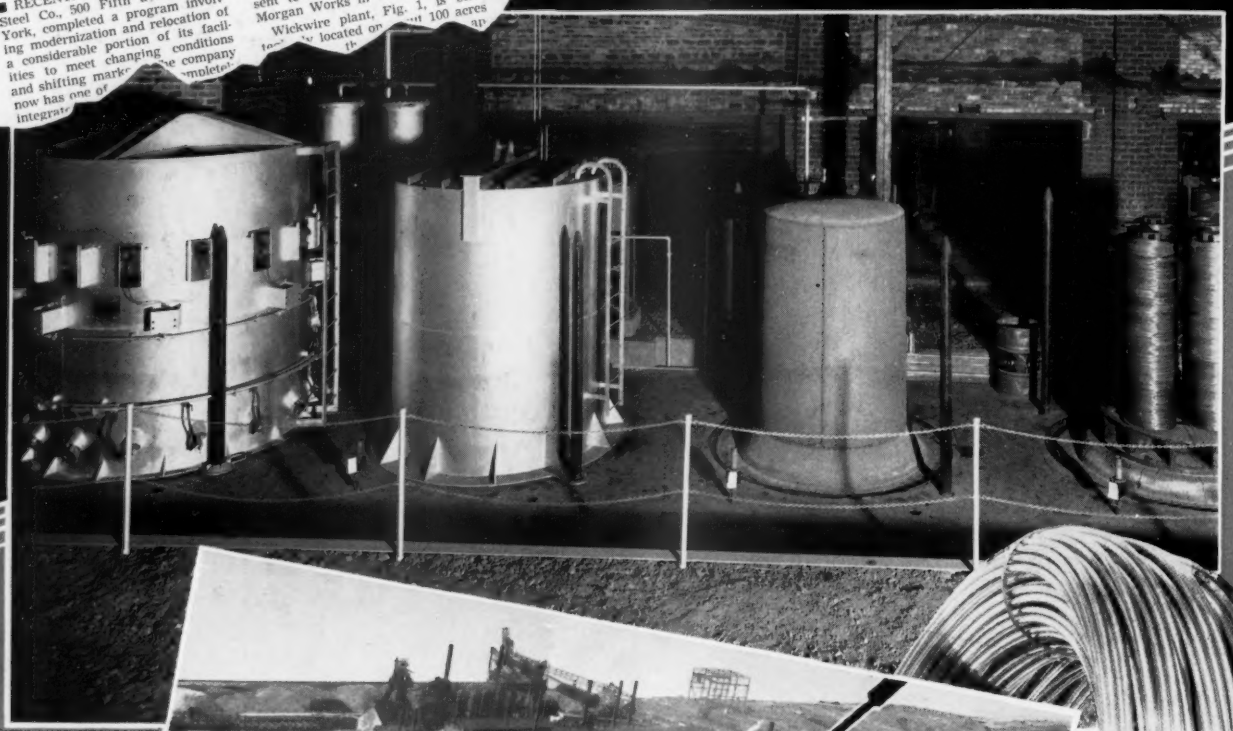
...completes $1,000,000 expansion and modernization program at Buffalo plant. Space for wire production is doubled. Wire-drawing machines operate at speeds up to 2200 feet per minute. Two new bell-type annealing furnaces added

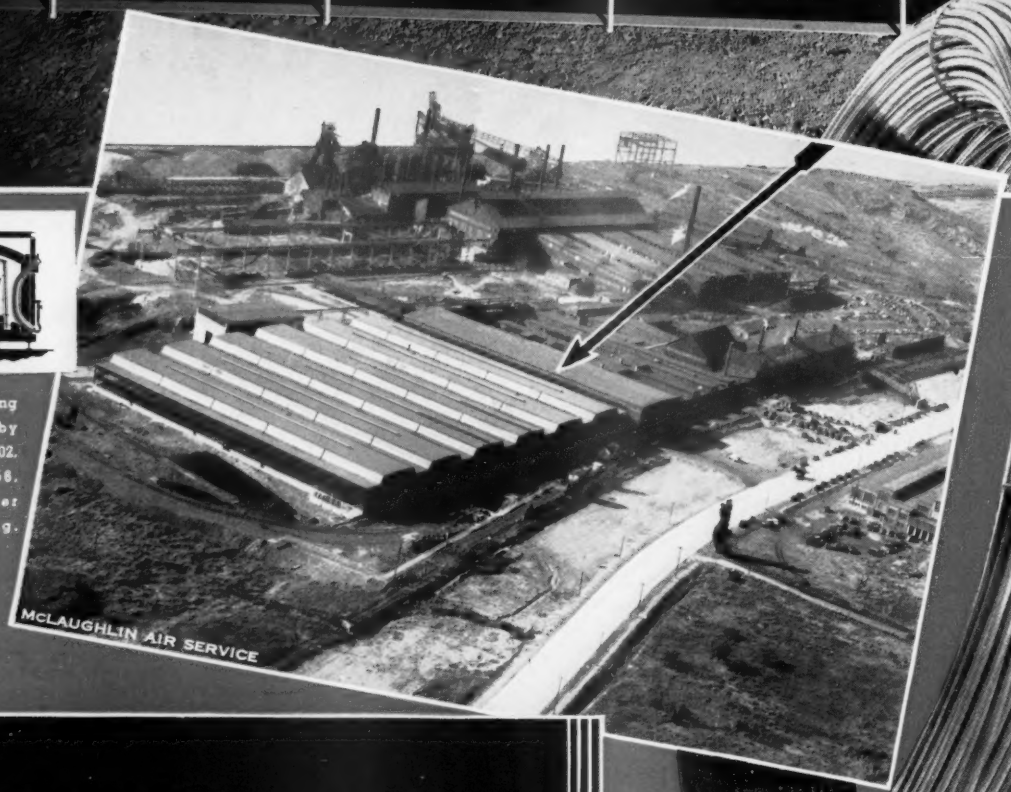
■ RECENTLY, Wickwire Spencer Steel Co., 500 Fifth avenue, New York, completed a program involving modernization and relocation of a considerable portion of its facilities to meet changing conditions and shifting marke... the company now has one of... completed integrate... more modern equipment at Godard was moved to Buffalo to handle peak loads, the balance being sent to Clinton, Mass., works and Morgan Works in Worcester.

Wickwire plant, Fig. 1, is stra... located on ...t 100 acres ap... cludes four stationary 60-ton basic openhearths, blooming mill and continuous rod mill. Rods are delivered to the rod yard on a continuous conveyor. ...l with 200,000 square ... more than double ...duction ...

This fine new Wickwire Spencer Mill, at Buffalo, uses WILSON WIRE ANNEALING EQUIPMENT for heavy tonnage production.

36,000 lbs. per day of 22″ and 16″ coils are handled in this unit.





The Wilson Annealing Unit is covered by Patents Nos. 1952402, 2068477, 2078356, 2081612, and other patents pending.

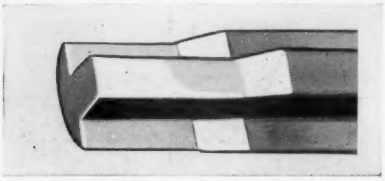
An Exclusive Development of

LEE WILSON ENGINEERING CO.

1370 Blount Street • Cleveland, Ohio

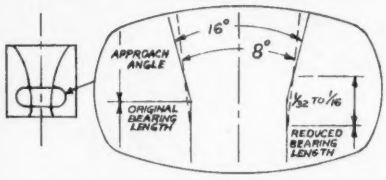
Carboloy Die Design Solves Difficult "T"-Bar Drawing Problem

In the designing of shape dies for drawing uniform sections of material, it is common practice to use one length of bearing in the die. However, in drawing such shapes of material as the "T"-bar illustrated, this practice cannot be followed, as the varying cross-section of the piece makes it necessary to size it in steps. This is done by using several angles of approach and lengths of bearing so that there is a progressive sizing of the drawn material. By this method the



control of the stock movement during the drawing process is such that the finished part can be held to close limits without causing undue die wear. On the "T"-bar shown, the distance from point to point of the head of the "T" had to be held within close limits and the section was thin and subject to tearing. Carboloy dies are being used successfully for this "T"-bar, and many other special shapes that are often difficult to draw.

One Way to Correct Out-of-Round Wire



Quite frequently a die which has been producing perfectly round wire will start drawing .0005″ to .001″ out of round. One way of overcoming this difficulty is to simply make up a pin with an included angle that is one-half of the approach angle. For example, if the approach angle has a 16° included angle, make the lapping pin with an 8° included angle. Using a No. 4 diamond powder, work this pin into the die and lap a cone, as shown, between the approach angle and the bearing. This cone should be about $\frac{1}{32}$″ long, or, in large dies, $\frac{1}{16}$″ long.

Many times when this condition arises, it is found that the reduction at the breakdown die has been decreased and is one of the basic causes of the trouble. If several dies are used in the line ahead of the troublesome die, it may be that one of these is also producing out-of-round wire and is another source contributing to the out-of-round condition.

Carboloy Masonry Drills

Your maintenance man would like to know about the Carboloy Masonry Drill. Drills concrete, brick, tile, etc., 75% faster than old methods. Ask for leaflet GT-103.

This Department Maintains a 1,500,000-Gram *Supplementary* Stock of Carboloy Blanks

To Anticipate Your Orders

The service you receive from an organization is composed of many things. The man who contacts you and helps solve your problems. . . . The policies of the organization—and the way they affect your dealings. . . . The degree to which the various parts of an organization—manufacturing, engineering, sales—are co-ordinated. . . . The facilities and the man-power of the organization available to produce and serve you efficiently . . . all of these factors affect the extent to which you receive "Service."

Adequate stocks are an important part of such service. In addition to keeping a large inventory of standard Carboloy products in finished form ready for shipment, Carboloy maintains a *supplementary* stock of 1,500,000 grams of cemented carbide in the form of semi-sintered ingots and cylindrical blanks. This partly processed stock helps speed up the manufacture of Carboloy cemented carbide for a wide range of standard and non-standard parts.

CARBOLOY COMPANY, INC., 11147 E. 8 Mile St., DETROIT, MICHIGAN

CHICAGO • CLEVELAND • NEWARK
PITTSBURGH • PHILADELPHIA
WORCESTER, MASS.

The Mark of CARBOLOY
REG. U. S. PAT. OFF.

Authorized Distributors:
Canadian Gen. Elec. Co., Ltd., Toronto
Hartley Wire Die Co., Waterbury, Conn.

CARBOLOY
REG. U. S. PAT. OFF.

TUNGSTEN CARBIDE—TANTALUM CARBIDE—TITANIUM CARBIDE

FOR CUTTING, DRAWING, SHAPING, EXTRUDING METALS AND NON-METALLICS
★ FOR REDUCING WEAR ON EQUIPMENT OR PRODUCTS YOU USE OR MAKE ★

Need Rods?

We're set up to serve you

With a rod to fit every job

Bethlehem furnishes steel rods in a complete range of analyses, heat-treatments and finishes. Regardless of the size or specialized character of your order, Bethlehem can fill it promptly and exactly from modern mills at Sparrows Point, Md., and Johnstown, Pa.

With expert advice

Bethlehem rod-and-wire specialists are always at the service of rod users. Their recommendations and suggestions often point the way to smoother, more economical production and to the solution of out-of-the-ordinary problems of manufacture.

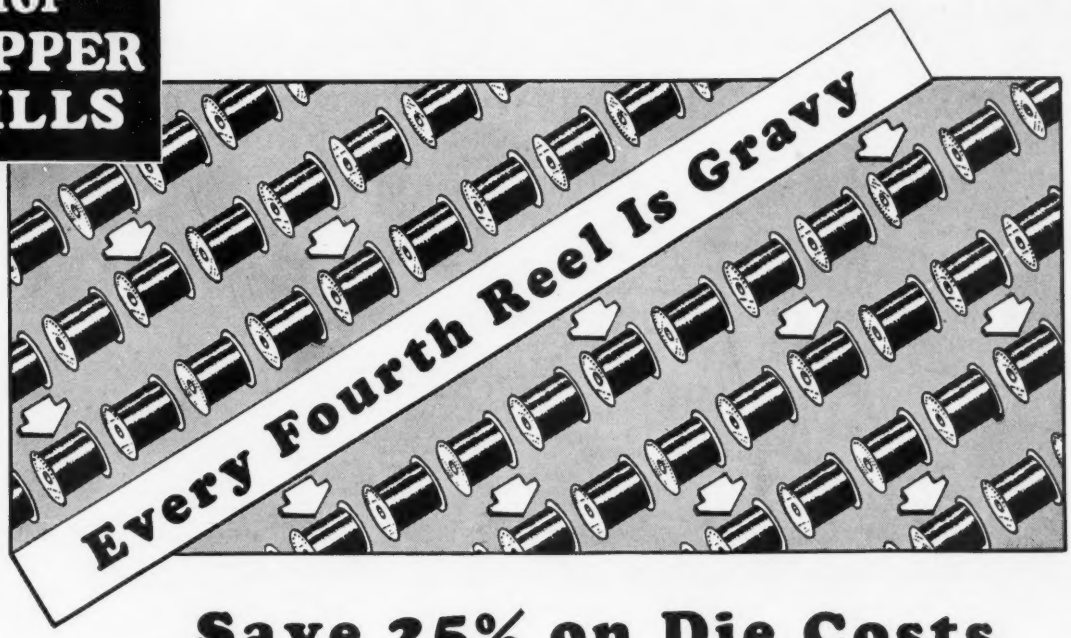
With rod workability that only new mills can provide

Bethlehem rods are rolled on new rod mills by improved, modern technique, backed by long experience in steel-making. They are rigidly inspected at every key operation in the path of production, and are the kind of rods that hold down costs on any type of processing job. Try them in your operations.

BETHLEHEM STEEL COMPANY

BETHLEHEM STEEL

BIG NEWS for COPPER MILLS



Save 25% on Die Costs

If you draw copper or bronze, you can draw four reels of wire for the cost of three, so far as die costs are concerned.

It's being done every day in those mills which have changed over to Vascoloy-Ramet COP-R-DRAW Dies.*

Can you overlook this opportunity to reduce costs when it is so simple to write, wire or phone a trial order?

*Vascoloy-Ramet Dies make savings on iron and steel wire, too.

Vascoloy

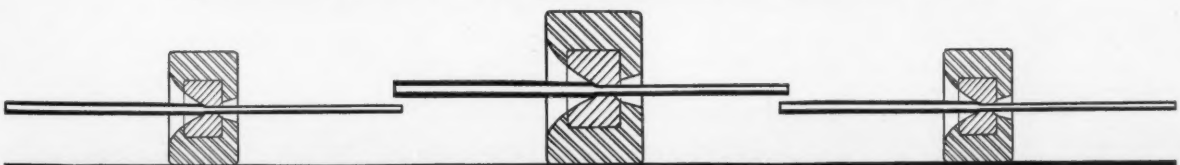
RAMET

TANTALUM-TUNGSTEN CARBIDE DIES

VASCOLOY-RAMET CORPORATION

NORTH CHICAGO, ILLINOIS

Pittsburgh, Pa.; Detroit, Mich.; Hartford, Conn.; Jersey City, N. J.; Cleveland, O.
In Canada: Carbide Tool & Die Company, Ltd., Hamilton, Ont.



COP-R-DRAW TUF-DRAW FER-O-DRAW

HUDSON WIRE CO. PLANT AT OSSINING, N. Y.

HUDCO

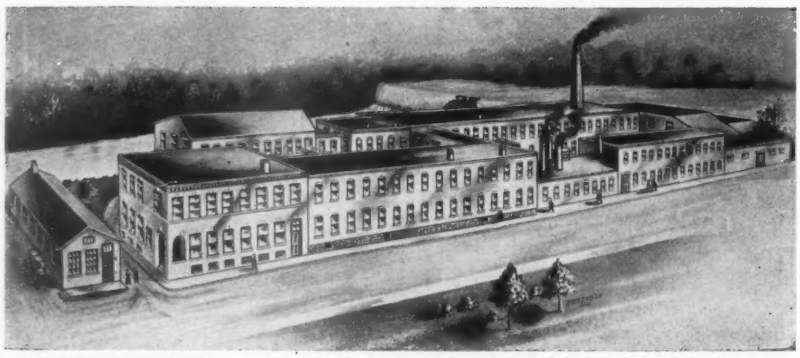
FINE WIRES IN ALL METALS

TWO MODERN AND COMPLETE WIRE PLANTS—— AT YOUR SERVICE——

LET US QUOTE ON YOUR WIRE REQUIREMENTS

WINCO

LEAKPROOF ENAMELLED WIRE



Winsted Divn. of HUDSON WIRE CO. at Winsted, Conn.

HUDCO

FINE BARE WIRES

High Brass, Low Brass, Zinc 99.99+ and High Tensile Zinc, Commercial Bronze, Phosphor Bronze, Pure Tin, Lead, Antimonial Lead, Tinsel Lahns, Silver Plated Copper, False Gold and Copper.

Cadmium, Nickel Silver, 10%, 18% and 30%; Silver Plated Copper, False Gold and Special Brass and Bronze Alloys to Specification, Metallic Fibre for Packing Purposes, Copper, Bronze, Zinc, Lead and Aluminum.

WIRES FOR METAL SPRAYING

Pure Lead, Lead Alloy, Pure Zinc, Zinc Alloy, Copper, Tin, High Brass, Low Brass, Solder Wire, High Conductivity, Electric Wire.

Cadmium, Nickel Silver, (10%, 18%, 30%); Aluminum, Monel Metal, Phosphor Bronze, Pure Nickel, Commercial Bronze.

"HUDCO" specially processed Copper Wire for enamelling purposes is drawn from Selected Copper, insuring the maximum conductivity. This is but one example of the use of the most advanced and approved materials and methods in our processing. BETTER WIRE AT LOWER COST.

LET US QUOTE

HUDSON WIRE COMPANY

OSSINING, N. Y.

SUCCESSORS ROYLE & AKIN

ESTAB. 1902 ESTAB. 1902

WINCO

LEAKPROOF ENAMELLED WIRES

Drawn from special oxygen-free copper that works so clean, so free from slivers, that enamelling is perfect. Leaks positively prevented. Every foot of WINCO enamelled wire is mercury tested before shipment to assure a wire perfect in every particular.

WINCO enamelled wire is covered to the same dimensions as fabric-covered wire so the user need not change his equipment. It will withstand softening in varnish-dipping and baking.

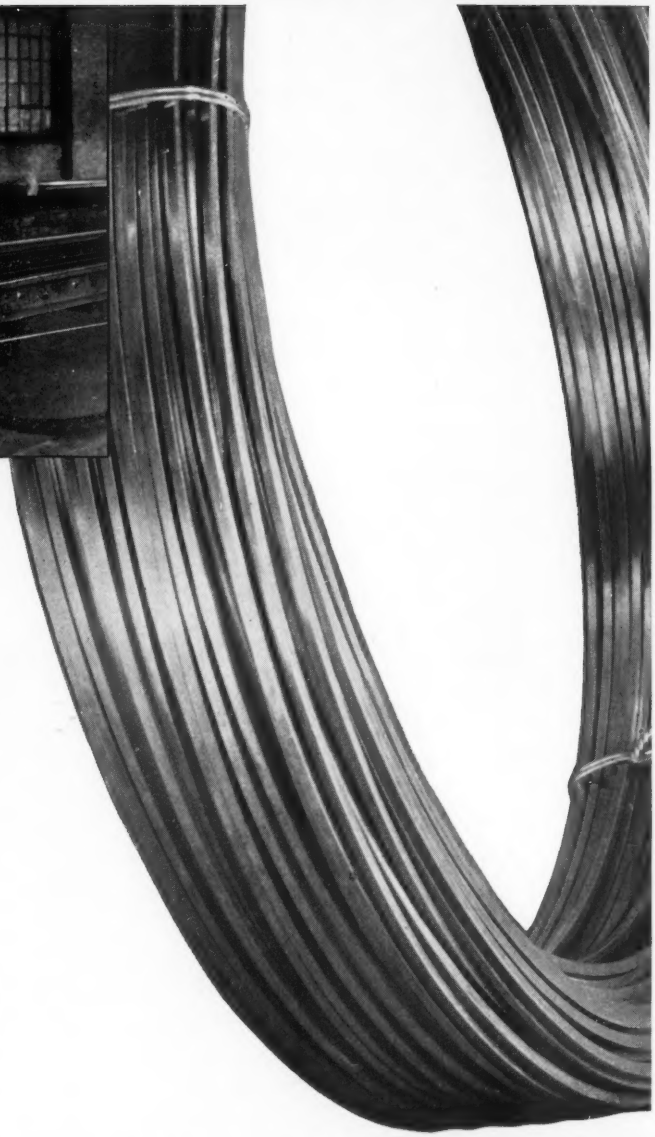
WINCO enamelled wire is lower in cost than silk covered wire. Write for sample.

LET US QUOTE

WINSTED DIVISION

HUDSON WIRE COMPANY

WINSTED, CONN.



Do You Use Special Wire & Rod?

In addition to the regular round stock in all commercial gauges, we supply Nickel Silver and Phosphor Bronze wire and rod in the following shapes:

Hexagon
Octagon
Square
Half Round
Oval
Half Oval

In this connection, may we refresh your mind as to the useful characteristics of Seymour Nickel Silver and Phosphor Bronze?

SEYMOUR NICKEL SILVER

Silvery white color that matches nickel, chromium or silver plating.
Takes chromium plating direct without preplating,
Resists corrosion in the extreme,
When leaded, it machines with great ease,
Any degree of hardness from dead soft to spring temper,
Available in any stage of ductility for forming and redrawing.

SEYMOUR PHOSPHOR BRONZE

Highly corrosion resistant,
Withstands almost endless "fatigue" cycles without serious loss of resiliency,
Extremely tough and resistant to friction and abrasion,
Practically indifferent to thermal change,
Supplied in all degrees of hardness up to a lively spring temper,
Alloys with lead for free turning.

Complete technical details and samples for test sent on request.

THE SEYMOUR MANUFACTURING COMPANY, 62 FRANKLIN ST., SEYMOUR, CONN.

SEYMOUR

NICKEL SILVER · PHOSPHOR BRONZE
SHEET - WIRE - ROD

You Can Tell Your Sales Story To

Hundreds of Prospects:-

THE KIND OF PROSPECTS YOUR SALESMEN DREAM ABOUT—RESPONSIBLE, TRAINED, KEY MEN IN THEIR PLANTS—WITH OVER 90% OF THE AMERICAN AND CANADIAN ROD, WIRE AND WIRE PRODUCTS PRODUCTION DEFINITELY UNDER THEIR CONTROL AND SUPERVISION.

▲▲▲

Reach this Market—

THE WIRE AND WIRE PRODUCTS INDUSTRY THROUGH ADVERTISING IN

WIRE AND WIRE PRODUCTS

▲▲▲

YOUR USE OF ADVERTISING SPACE IN THIS PUBLICATION WILL RESULT IN SALES OF YOUR PRODUCT, EQUIPMENT, SUPPLIES OR SERVICES.

▲▲▲

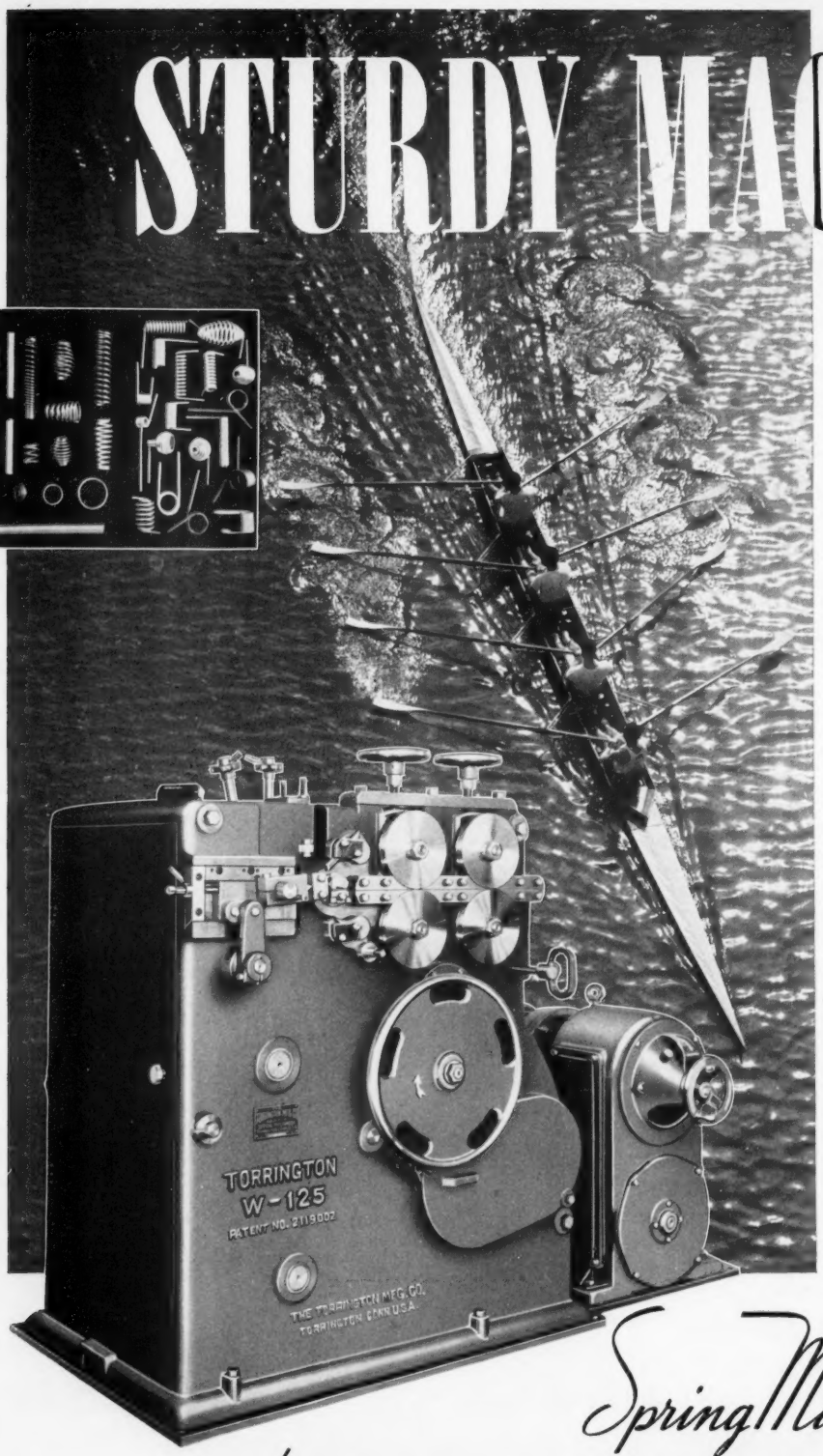
We offer a complete industrial coverage through
Technical Information—in "Wire and Wire Products"
Buying Reference in the "Annual Wire Buyers Guide"
Special Mailing Lists for Advertisers
Personal Contacts Through Membership in The Wire Association
Exhibit Space at the National Metal Congress
An Information Service for Advertisers

YOU WILL BENEFIT FROM OUR SERVICE
FOR COMPLETE DETAILS
WRITE

WIRE AND WIRE PRODUCTS
300 MAIN ST., STAMFORD, CONN.

STURDY MACHINE

WINS BY SPEED AND PRECISION



Built approximately 75% heavier than earlier types, with weight distributed to correct weaknesses, TORRINGTON Spring Coiling Machines have heavy, rigid vital parts to prevent back lash. Tools are rigidly supported while forming wire. This means a uniformly accurate coil at higher speeds because Timken Roller Bearings (used throughout) provide for combined radial and thrust loads, with simple adjustment to take up wear.

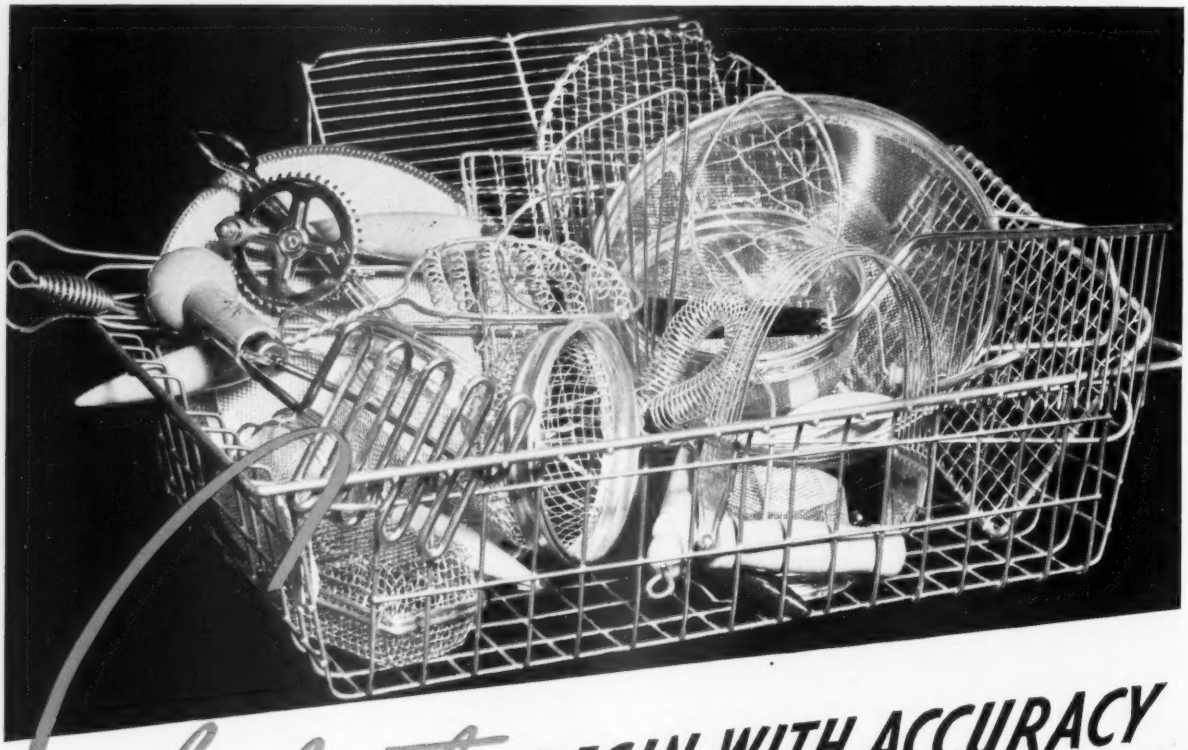
For longer life at higher speeds — for increased production of more uniformly accurate springs — investigate these modern spring coiling machines by TORRINGTON.

Model W-125 Segment Type Spring Coiler illustrated has wire diameter range from .080" to .207". Wire length per spring from 0" to 74" (with special gearing for small diameter wires, 0" to 147"). Coil range, inside diameter, ⅜" to 3½".

THE TORRINGTON MFG. CO.
Torrington • Connecticut

Spring Making Machines

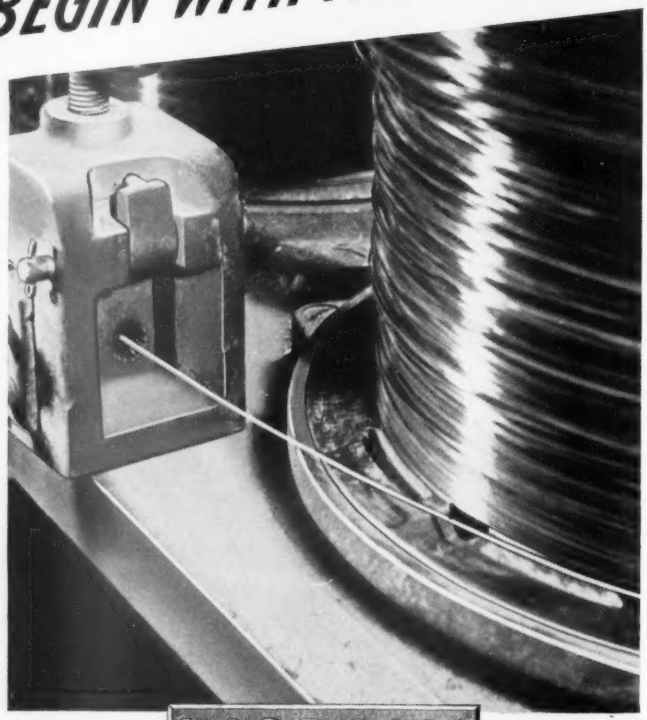
by **TORRINGTON**



Gadgets BEGIN WITH ACCURACY

Under the mass production system, miles and miles of wire go into our modern household "gadgets" each day. High speed and low costs are vital in preserving the slender margin of profit—and these in turn depend on uniform quality and accuracy of material.

These basic requirements are routine matters for Morgan-Connor Continuous Wire Drawing Machines. Their individual high block design and unique air-cooling system afford uniformly good quality in high and low carbon wire, drawn at high speed.



MORGAN CONSTRUCTION CO.
WORCESTER, MASSACHUSETTS, U. S. A.

Sole European Representatives:
MALMEDIE & CO., Dusseldorf, Germany

- Continuous Wire Drawing Machines; Take-up Frames; Horizontal Bull Blocks; Vertical Spindle Bull Blocks; Reels; Pointers; Motor Drives; Wire Mill Accessories.

MORGAN
WORCESTER
ENGINEERS AND
MANUFACTURERS

MORGAN *Wire Drawing Machinery*

W46

WIRE AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip, Wire and Rod Products and Insulated Wire and Cable

DRAWING—ROLLING—EXTRUDING—FORMING—FABRICATING

Vol. 15 MARCH, 1940 No. 3

Designated as

Official Publication By The Wire Association

Contents

Wiring the Eiffel Tower ..... By C. M. Chambers 147

The wiring of the Eiffel Tower for television transmission required the use of twelve tons of three inch coaxial cable. The installation method followed is outlined here.

Theory and Practice of Modern Taping and Stranding ..... By Otto F. Jagielski 149

Part I—Taping. This paper is presented to those interested in Wire Mill machinery as a discussion of the major design features that are necessary in the manufacture of a better product.

1939 Developments in Industrial Heating Equipment ..... By C. P. Ipsen 153

Handling Blue Prints and Sketches in the Factory ..... By James L. Courtney 154

A system for the correct filing and easy handling of wire mill blue prints and sketches as used in a large British plant.

Standard Improves Weather Resistance of Coverings for Aerial Wire and Cable ..... By L. L. Carter and Alfred Bellis 157

Reactive Wire Drawing ..... By H. A. Stringfellow 159

An analysis of the results secured in actual operation through the application of the principle of reactive wire drawing.

New Type Nickel Fish Hooks 160

Statistics — Fourth Quarter — 1939, American Iron & Steel Institute 161

Worcester Regional Meeting in 1940 173

Outstanding Personalities of the Wire Industry 162

Exports and Imports of Wire 163

'Round the World with the Wire Industry 168

A Review of Recent Wire Patents 170

Index to Advertisers 185

Where to Buy 186-188

—ASSOCIATE EDITORS—

Kenneth B. Lewis, Consulting Wire Mill Engineer
W. H. Spowers, Jr., Consultant on Galvanizing
Lancaster, Allwine & Rommel, Consultants on Patent Information
European Correspondent
Paul Fidrmuc

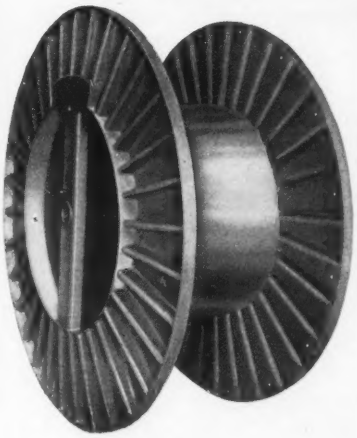
Richard E. Brown, General Manager
R. S. Spengel, Business Manager

Publication Office: Washington, N. J.
Executive Office: Stamford Trust Co. Bldg., 300 Main St., Stamford, Conn.
Annual Subscription, U. S. $5.00, Canada $5.00
50 Cents a Copy in U. S. Issued Monthly Foreign, $7.50
October Convention Issue $1.00 a Copy
January Convention Discussions Issue $1.00 a Copy

Copyright 1940, Quinn-Brown Publishing Corp. WIRE AND WIRE PRODUCTS is fully protected by copyright and nothing that appears in it may be reprinted wholly or in part without permission.

WIRE & WIRE PRODUCTS, Vol. 15, No. 3, March, 1940, Executive Office, 300 Main St., Stamford, Conn. Published by the Quinn-Brown Publishing Corp., Richard E. Brown, President; R. S. Spengel, Secretary and Treasurer. Publication office, 13 West Church Street, Washington, N. J. Subscription price: U. S., $5.00; Canada, $5.00 per year, 50 cents per copy; Foreign, $7.50 per year. Entered as second class mail at the Post Office, Washington, N. J., under Act of March, 1879.

FOR REEL ECONOMY



STEVENS
LOW-TARE
STEEL SHIPPING REELS

AND

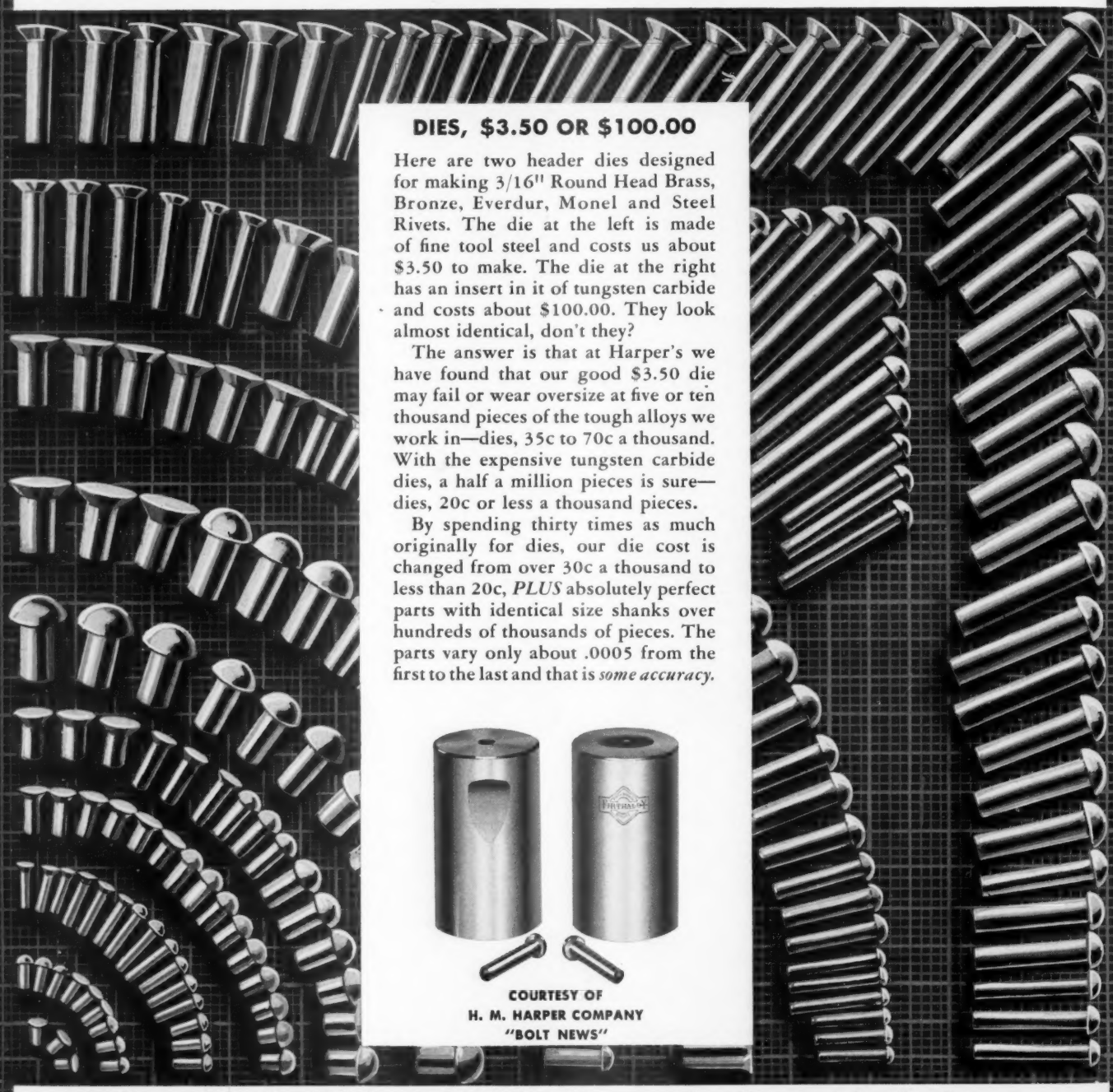
STEVENS FLANGED STEEL DRUMS

LOW-WEIGHT
PLUS
LONG LIFE

MADE IN
IPCEA AND SPECIAL SIZES
COMPLETE DATA & PRICES UPON REQUEST

THE STEVENS METAL PRODUCTS CO.
NILES, OHIO

DO YOUR DIES COST $3.50 OR $100.00?



DIES, $3.50 OR $100.00

Here are two header dies designed for making 3/16" Round Head Brass, Bronze, Everdur, Monel and Steel Rivets. The die at the left is made of fine tool steel and costs us about $3.50 to make. The die at the right has an insert in it of tungsten carbide and costs about $100.00. They look almost identical, don't they?

The answer is that at Harper's we have found that our good $3.50 die may fail or wear oversize at five or ten thousand pieces of the tough alloys we work in—dies, 35c to 70c a thousand. With the expensive tungsten carbide dies, a half a million pieces is sure—dies, 20c or less a thousand pieces.

By spending thirty times as much originally for dies, our die cost is changed from over 30c a thousand to less than 20c, *PLUS* absolutely perfect parts with identical size shanks over hundreds of thousands of pieces. The parts vary only about .0005 from the first to the last and that is *some accuracy.*

COURTESY OF
H. M. HARPER COMPANY
"BOLT NEWS"

Initial cost may be high but FIRTHALOY Dies are the cheapest in the long run.

FIRTH-STERLING STEEL COMPANY

Works: McKEESPORT, PA.
NEW YORK CHICAGO
HARTFORD PHILADELPHIA
LOS ANGELES DETROIT
CLEVELAND DAYTON
GLOBE WIRE DIVISION
McKEESPORT, PA.

WIRE AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip.
Wire Products and Insulated Wire and Cable.

DRAWING --- ROLLING --- EXTRUDING --- FORMING --- FABRICATING

Vol. 15 MARCH, 1940 No. 3

Wiring The Eiffel Tower

By C. M. Chambers,
Paris, France

The wiring of the Eiffel Tower for television transmission required the use of twelve tons of three inch coaxial cable. The installation method followed is outlined here. ✦ ✦ ✦

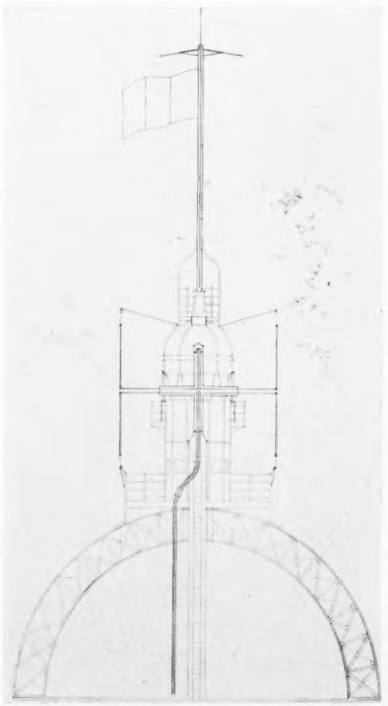
IN 1933, the French Government installed an experimental television transmitter in the Ministry of Posts on the rue de Grenelle, Paris. This pioneer research work was continued two years, when it was decided that the experimenting had produced sufficiently concrete results to warrant the installation of their findings in a new and more powerful station.

✦ ✦ ✦

THE Eiffel Tower, at the time given over entirely to radio broadcasting, was selected and the entire work of installing was confided to the **L. M. T. Laboratories**, European Branch of the **Western Electric Co.** whose technical engineers had conducted the two years of experimenting. The studio was to be retained on the rue de Grenelle, one mile distant.

✦ ✦ ✦

EARLY in 1937, all parts had been assembled, the antenna had been erected close to the flagstaff on the peak of the tower, the transmitter had been installed in a small building located at the south support of the tower and the only work which remained to be accomplished to set in motion the World's most modern television transmission was the connecting of the two points, the antenna with the transmitter, a total distance of approximately thirteen hundred feet with twelve tons of three inch cable.



Outline sketch of aerials. The sound antenna is at top of flag pole. The vision antenna surrounds the top of the tower, about 12 feet below the base of the flag pole. ✦ ✦ ✦

✦ ✦ ✦

BIDS for this hoisting job were requested from the different houses specializing in that sort of work and none were willing to offer a price. Owing to the delicate nature of the requirements and unable to secure insurance to cover the risk, all refused to make a bid. Selecting a group of workers from their own factory, mostly ex-sailors in the French Navy, the technicians of the **L. M. T. Laboratories** prepared to do the work themselves.

✦ ✦ ✦

The Coaxial Cable

THE cable was delivered at the base of the Tower, mounted on two drums each having an internal diameter of approximately thirteen feet and measuring nine feet in width. The cable has an overall diameter of 123 mm and comprises a hollow interior copper conductor, with an external diameter of 28

Twenty selected workmen accomplishing a work that no Paris contractor could be found who was willing to accept the responsibility. ✦

mm. and an external conductor made up of copper shell-like joints fitting into each other forming a tube of about three inches in diameter. The interior conductor is maintained in a central position inside the exterior conductor by means of special isolantite insulators. The complete assembly is protected by a lead cover and steel-wire armouring.

✦ ✦ ✦

THE cable weighs twenty-one pounds to the foot, the minimum radius for bends is five feet and the maximum strain six tons and the breaking load, when hoisting, is thirty tons.

✦ ✦ ✦

Hoisting the Cable

THE technicians from the L. M. T. Laboratories had spent considerable time in selecting, what they considered, the most favorable route to follow in hoisting the cable. From the ground to the second platform of the Eiffel Tower, the route selected followed, approximately, the south support and from this point, continued to the top, following the vertical axis of the Tower. The total length of the cable is, approximately, thirteen hundred feet and the total weight, distributed throughout the complete frame of the Tower, is about twelve tons.

✦ ✦ ✦

IRRESPECTIVE of the various problems which arose during the installation of the cable and the heavy responsibilities which a job of such magnitude entails, the operation was rendered particularly difficult by the fact that work had to be carried out during the "Paris World's Fair" and without any impedance whatsoever to the regular traffic of visitors visiting the tower.

✦ ✦ ✦

Handling the Cable

THE cable was divided into six lengths, varying from one hundred to three hundred feet long and each weighing from one to three tons.

Length No. 1 connects the antenna to the third platform. Length, 105 feet; weight, approximately 1 ton.

A section of semi-flexible coaxial cable to feed the antenna. ✦ ✦ ✦

The special 13 CM. Coaxial cable weighing 12 tons, being hoisted in a heavy wind to the Antenna, 1,200 feet in the air, photo shows Jean-Marie Archange, Engineer in charge of work.

Length No. 2 connects the third platform to an intermediate platform situated mid-way between the 2nd and 3rd main platforms of the Tower. Length, 222 feet; weight, 2¼ tons.

Length No. 3 connects above mentioned intermediate platform to a point at the top of the south support of the Tower, which is at the second platform. Length 310 feet; weight 3 tons.

Length No. 4 follows a route down the south support, connecting approximately the second and first platforms. Length, 224 feet; weight, 2¼ tons.

Length No. 5 connects the first platform to the base of the south support. Length 140 feet; weight 1½ tons.

Length No. 6 connects the base of the south support to the transmitter equipment. Length 210 feet; weight, 2¼ tons.

✦ ✦ ✦

Installation Work

THE installation of the cable was carried out in two series of operations;

✦ ✦ ✦

1. LENGTHS 1-2-4 and 3 were hoisted in the order indicated, by a six ton power winch operated from the fourth platform. This electrical winch was equipped with 1,000 feet of cable which was suspended through the center of the construction, thus enabling the vertical hoisting of the various cable lengths, the ends of which

(*Please turn to Page 183*)

Theory and Practice of Modern Taping and Stranding

By Otto F. Jagielski,
Consulting Engineer,
Lynn, Massachusetts

PART I — Taping

This paper is presented to those interested in Wire Mill machinery as a discussion of the major design features that are necessary in the manufacture of a better product.

ECONOMICAL taping of cables still offers greater problems to operators of these departments than stranding. For this reason I shall discuss "Taping" first.

✦ ✦ ✦

IN the monthly publication "Wire and Wire Products" of the August 1932 issue and continued in June 1933, I wrote an article entitled, "High Tension Cable Production". On page 268 (August issue) I have listed the principal features of which a modern taping machine should consist. Among these features were the following:

A) The largest possible pads in order to decrease the number of binding lays to a minimum.

B) A satisfactory method of leading the tape from pad to point of application, so that the middle axis of the tape remains at a 90 degree angle to the middle axis of the guide rolls.

C) A self-adjusting angle of application, so that if the speed of the cable advance is changed during the operation, the angle of application will change automatically.

D) As near uniform tension as possible,—a tension which can be set properly while the machine is standing still and which will not change appreciably during the operation.

E) An automatic stop, so that when the tape breaks or the pad runs out, the machine will stop quickly.

F) A uniform advance of the cable through the machine. Any blacklash or possible slippage must be eliminated.

G) A taping machine with many tapes, built as short as possible and still allowing sufficient space for the operator to handle and watch the tapes.

H) The elimination of cable twist, caused by pull of the tape and poor guide of the cable over the capstan.

I) The taping machine should be designed so that when replacing pads, no part of the machine should be removed; whereby, the pre-set tension and tape guides from pad to point of application will remain undisturbed.

✦ ✦ ✦

FEATURES "H" and "I" were not mentioned in my first articles, however, realizing their importance, they will be discussed here. These features should be considered carefully by users of taping machines when seeking answers to their production problems.

✦ ✦ ✦

NOW, it is not my intention to illustrate in this paper a machine containing all the nine features; however, it will be of general interest to discuss the consequences of a machine in which these features are missing. By so doing, it will help the operator to locate the actual faults and eliminate them, if possible, on an existing machine.

✦ ✦ ✦

ANOTHER purpose of this discussion is to prove to the user of taping machines, that it will pay him in the long run to spend somewhat more money for a machine consisting of all the features above than to invest less for a machine with the above features partially or entirely missing.

✦ ✦ ✦

When designing and building a taping machine, with all the above features employed, the design should be based on these features.

Improving a taping machine after the same has been built without considering the above features, will definitely fail to be economical. The reason will be seen in the following analysis of the nine above features.

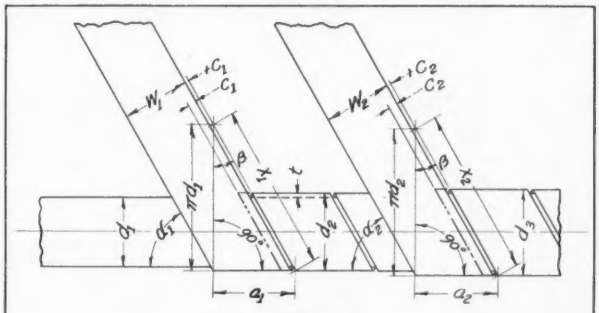


FIGURE 1

FORMULAS

(1) $\cos\alpha = \frac{W \pm C}{\pi d}$

(2) $a = \frac{W \pm C}{\sin\alpha}$

(3) $\tan\beta = \frac{a}{\pi d}$

(4) $\alpha = 180° - (90° + \beta)$

(5) $(W \pm C) = a \times \sin\alpha$

(6) $\pm C = (W \pm C) - W$

(7) $x = \sqrt{a^2 + (\pi d)^2}$

(8) $A = \frac{N_H \times a}{12}$

(9) $B = \frac{N_H \times a}{D + d_n \times \pi}$

NOTATION

A = Theoretical Output of Cable in Feet per Minute.
B = R.P.M. of Capstan.
+C = Space Between Tape.
-C = Lap of Tape.
D = Diameter of Capstan.
N_H = R.P.M. of Head.
W = Width of Tape.
a = Lay of Tape.
d = Diameter of Cable.
d_n = Diameter of Cable Over the Insulation.
t = Thickness of Tape.
x = Length of Tape Laid Per Turn of Head.
α = Angle of Application.

THE illustrations and mathematical formulas we will need for this analysis are shown in **Fig. 1 and Formulas and Fig. 2 and Formulas.**

✦ ✦ ✦

Feature A

THE largest possible pads are advisable in order to decrease number of binding laps to a minimum.

✦ ✦ ✦

A) To what extent, however, will production be effected when using a large pad as compared with using a small pad?

CONSIDERING a modern eccentric type taping machine in which the time of first and only setting of desired tension (Feature "D"), setting of point of tape application (Feature "C"), and placing and replacing pads (Feature "I"), is reduced to a minimum, the production speed will be limited only by the maximum permissible speed of the head which is determined by the overall diameter of the head and the width of the tape.

✦ ✦ ✦

BASED on my experience, the economical speed of a modern taping head section containing 36-24" diameter pads, eccentrically located around the center with a space of 2" allowed for each pad, or a total length of taping head section of 72", is 220 R. P. M.—all tapes rotating in one direction.

✦ ✦ ✦

THE economical speed of the same taping head section but built for pads of 16" in diameter is 300 R. P. M.

✦ ✦ ✦

THE time for preparing, loading the machine with 36 pads, and adjusting the tension and point of application is considered to be the same on both machines.

✦ ✦ ✦

BOTH machines are assumed to be equipped with brakes controlled by automatic stops which stop the machine when pads run out and indicators for locating the empty pad holder instantly.

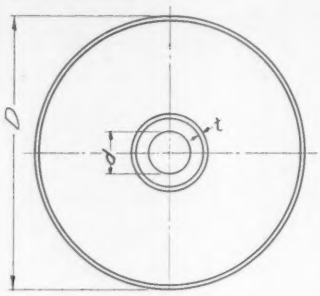


FIGURE 2.

FORMULAS

(10) $N_p = \frac{(D-d)}{2t}$

(11) $L = \left(\frac{\pi D^2}{4t}\right) - \left(\frac{\pi d^2}{4t}\right)$

(12) $l = \frac{La}{x_n 12}$

NOTATION

D = Diameter of Tape Pad in Inches.
L = Length of Tape per Pad in Inches.
N_p = Number of Turns on Pad.
d = Diameter of Core in Inches.
l = Length of Cable in Feet.
t = Thickness of Tape in Inches.
a = Lay of Tape in Inches.
x = Length of Tape Laid in Inches, Per Turn of Head.

✦ ✦ ✦

CONSIDERING the above now, it is only necessary to calculate the actual running time, the number of pads required for a certain length and diameter of cable, and the time necessary to place the pads in the machine in order to answer the question "A_1".

✦ ✦ ✦

Example

A STRANDED round conductor 3,000 feet long and 1" in diameter to be covered with 36 tapes ¾" wide x .006" thick. Pads 24" in diameter with a 6" core—operating speed of head section 220 R. P. M.

To calculate the time necessary to cover the conductor from the time the first tape is ready to be adjusted and applied.

✦ ✦ ✦

THE time necessary to place 36 pads on the machine and adjust tension and point of application at the start is two minutes per tape or 72 minutes for all pads. Every replacement of pads will take one minute. The time necessary to bring the machine up to full speed and from full speed to a stop, will be neglected in this example. Consider this time included in the time allowed for placing and replacing the pad. No tape will break on a modern machine unless the tape is defective. Assuming that all tapes are perfect, no time shall be allowed for repairing the breakages.

✦ ✦ ✦

THE actual running time, plus the time for starting 36 tapes and adjusting the tension, plus the time for pad replacements equals the time to tape the cable.

✦ ✦ ✦

1st. The Actual Running Time

THE first tape is layed on the cable with a close butt, c=O. See Fig. 1.

given: cable diameter=1"
width of tape=.75"
thickness of tape=.006"
speed of head=220 R. P. M.
Length of cable=3,000 feet.

✦ ✦ ✦

IN order to calculate the lay "a", the angle of tape application α must be known.

Formula No. 1 — $\cos \alpha = \frac{(W \pm c)}{(\pi \times d)}$

$W = .750,\ d = 1'',\ c = O$

$\text{Cos } \alpha = \frac{(.750 + 0)}{\pi \times 1} = 0.2387$

Angle of application $\alpha = 76.2^0$

Formula No. 2: Lay "a" $= \frac{(W \pm c)}{\sin \alpha}$

$W = .750'',\ c = O : \sin \alpha = 0.9711$

$\text{Lay "a"} = \frac{(.750'' + 0)}{0.9711} = .7723''$

Cable to be covered is 3,000 feet—or 36,000". $\frac{\text{Length of cable in inches}}{\text{Lay}} =$ 46,614.00 turns of head necessary to cover the 3,000 ft. of cable.

Time in minutes $= \frac{\text{turns of head}}{\text{R.P.M. of head}} =$ 212.

Actual machine running time = 212 minutes.

2nd. The Time for Pad Replacement

IN order to determine the number of pad replacements, it is necessary to calculate the length of tape required for all 36 layers and to divide this length by the length of tape contained in one 24″ diameter pad.

✦ ✦ ✦

1st. The length of tape for the first layer:

WE determined the lay "a" = .7723″ with the number of lays = 46,614.00 for the 3,000 foot cable.

Formula (7)

$$X = \sqrt{a^2 + (\pi \times d)^2}$$

$$a = .7723'', \; d = 1''$$

$$X = \sqrt{.7723^2 + (\pi \times 1)^2} = 3.235''$$ per lay.

✦ ✦ ✦

3.235 x 46,614.00 = 150,796.29″ = length of tape for 1st layer. (For more exact calculation of x add **one** thickness of tape to "d", d + t = 1.006″).

✦ ✦ ✦

2nd. The length of tape for 36th layer:

"a" = .7723, d = 1″ + (70 x .006) = 1.420″

$$X = \sqrt{a^2 \quad (\pi \times d_{35})^2}$$

Formula (7)

$$X = \sqrt{.7723^2 + (\pi \times 1.420)^2} = 4.527''$$

✦ ✦ ✦

4.527 x 46,614 = 211,025.58″ length of tape for 36th layer. The average length of tape for each layer is 180,910.94.

3rd. The total length of tape for all 36 layers then is 36 x 180,910.94 = 6,512,793.84″ or 542,732.82 feet.

✦ ✦ ✦

4th. The length of tape contained in one 24″ dia. pad is:

Formula (11)

$$L = \left(\frac{\pi D^2}{4t}\right) - \left(\frac{\pi d^2}{4t}\right)$$

$$D = 24'', \; d = 6'', \; t = .006''$$

$$L = \left(\frac{\pi \times 24^2}{4 \times .006}\right) - \left(\frac{\pi \times 6^2}{4 \times .006}\right) =$$

70,686″ or 5,890.5 ft.

✦ ✦ ✦

The total length of tape required for all 36 layers = 542,732.82 ft. divided by the length of tape contained in one pad = 5890.5 feet gives the number of pads = 92.13 or in round figure = 93 pads.

DUE to the different lengths of tape for each layer we allow 18 pads more for replacement time. That brings it to 111 pads to complete the 3,000 foot length of cable.

✦ ✦ ✦

OF these 111 pads we have placed 36 in machine when starting and, therefore, have only 75 replacements. One minute for each replacement or 75 minutes for 75 replacements. Now we have:

Placing and starting 36 pads =	**72**	**minutes**
Actual machine running time =	**212**	**minutes**
75 pad replacements =	**75**	**minutes**
Total	**359**	**minutes or 5 hrs. and 59 minutes**

✦ ✦ ✦

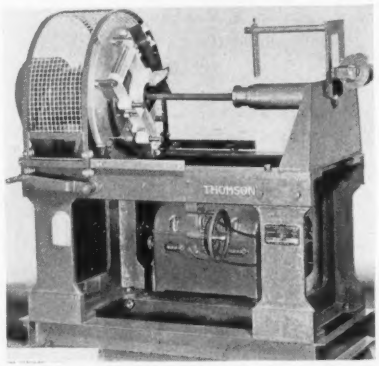


Fig. 3. Single Tape Concentric type taping machine for use between rubber tuber and its capstan or takeup.

✦ ✦ ✦

NOW, to consider the machine using 16″ diameter pads and operating at a speed of 300 R. P. M., these two values only will change, the others will remain the same. Therefore, the actual machine running time =

$$\frac{\text{turns of head}}{\text{R.P.M. of head}} = 155.38 \text{ minutes.}$$

✦ ✦ ✦

LENGTH of tape contained in one 16″ diameter pad:

$$L = \left(\frac{\pi \times 16^2}{4 \times .006}\right) - \left(\frac{\pi \times 6^2}{4 \times .006}\right) =$$

28,788.00″ = 2,399 ft.

✦ ✦ ✦

AS before we divide the total length of tape required for all 36 layers = 542,732.82 feet by the length of tape contained in a 16″ diameter pad = 2,399 giving the number of pads = 227 — adding 18 pads more for replacement time that brings it to 245 pads to complete the 3000 foot cable. 36 of these 245 pads have been placed at the start and, therefore, it requires 209 replacements — one minute per replacement or 209 minutes for 209 pads.

✦ ✦ ✦

THE time now to apply the 36 layers of tape on the 3000 foot cable at the higher speed of head and smaller diameter pad:

Placing and starting 36 pads =	**72**	**minutes**
Actual running time =	**155.38**	**minutes**
209 replacements =	**209**	**minutes**
Total	**436.38**	**minutes**

or seven hours and 16.38 minutes.

✦ ✦ ✦

Conclusion of This Analysis

Larger pads and slower speed is more economical.

✦ ✦ ✦

Feature B

A SATISFACTORY method of leading the tape from pad to point of application, so that the middle axis of the tape remains at a 90 degree angle to the middle axis of the guide rolls.

✦ ✦ ✦

THIS feature is very important, in order to apply the tapes uniformly and without edgewise pull, eliminating one of the chief causes of tape breakage.

✦ ✦ ✦

IT is difficult, however, to determine whether the tape pulls off the pad edgewise or uniformly throughout the width of the tape. A skillful operator can feel the tension on both sides of the tape and adjust the guide rolls accordingly.

✦ ✦ ✦

ANOTHER indication of improper guide roll adjustment and subsequent edgewise pull of tape, is when the tape is applied tight on one side and loose on the other, or when the adjusted point of application changes its position periodically, that is, when the tape overlaps on one side and leaves a larger than theoretical space on the other.

WHEN there are a great number of tapes, all with the same width and same speed applied, an increasing open space between the tapes will develop.

✦ ✦ ✦

To calculate this open space between the tapes of each layer, we will consider the above example: To begin, the first layer was applied with a close butt,—that is, c = O. If we now calculate the space between the tape of the last (36th) layer, we know that this is the maximum open space between the tapes in this instance.

✦ ✦ ✦

IN order to calculate the space between tapes of the 36th layer, we must know the angle of application "α" of the 36th tape.

We have:

$d_{35} = 1.420''$, W = .75", a = .7723"

To be determined:

"α_{36} and "C_{36}"

Formula (3)

$$\tan \beta = \frac{a}{\pi d_{35}} = \frac{.7723}{\pi \times 1.420} = 0.17312$$

$\beta = 9.8^0$

Formula (4)

$\alpha = 180^0 - (90^0 + \beta)$

$\alpha = 180^0 - (90^0 + 9.8^0) = 80.2^0$

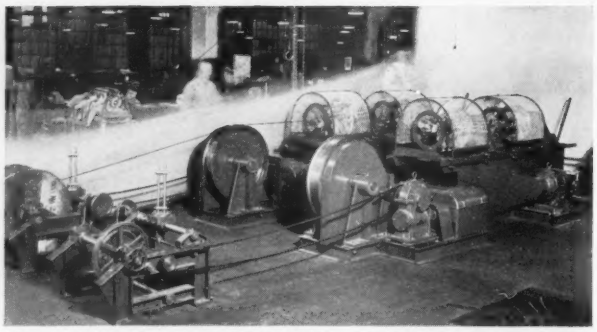


Fig. 4. Eccentric Type—High-Speed Varnish Cambric Taping Machine with payoff and takeup stands. ✦ ✦ ✦ ✦

Formula (5)

$(W \pm C) = a \times \sin \alpha$

$(W \pm C) = .7723 \times .9854 = .761''$

Formula (6)

$\pm C = (W \pm C) - W$

$\pm C = .761 - .750 = .011''$

✦ ✦ ✦

THE theoretical maximum open space is only .011" in this case.

✦ ✦ ✦

Conclusion of This Analysis

✦ ✦ ✦

THE tape guide roll feature on a modern taping head must be so designed that, when adjusting same, the possibility of edgewise pull of the tape will be **automatically eliminated.**

✦ ✦ ✦

(Part II will be published in April issue of Wire and Wire Products.)

Glare Protection

WIRE mill operations and the increasing use of arc and gas welding in industry present a complex problem in eye protection involving the safeguarding of the eye not only from the glare of visible light but also from dangerous infra-red and ultra-violet rays.

TO choose the proper glare protection glass, **American Optical Company** has prepared the following table which summarizes test data on the density, percentage of transmission of visible light, and the absorption of the dangerous ultra-violet and infra-red rays of Noviweld and Calobar glass developed specifically for industrial use. In the first column will be found suggestions, based on hundreds of proved applications, for the choice of the proper shade for a number of industrial jobs involving exposure to glare.

The Job	†The Glass	Density	Visible Light Transmission	Dangerous Ray Absorption	
				Ultra-Violet	Infra-Red
Carbon arc welding and cutting. Electric furnace operation.	NOVIWELD 14	5.57	.0003%	100%	99.99%
Metallic electric arc welding 250 amperes or more.	12	4.71	.0019%	100%	99.99%
Metallic electric arc welding 75 to 250 amperes.	10	3.86	.014%	100%	99.99%
Heavy acetylene cutting and welding.	8	3.00	.10%	100%	99.9%
Acetylene welding. Set-up work on electric welding. Fire box observations.	6	2.14	.72%	100%	99.9%
Acetylene burning, cutting and brazing.	5 4	1.71 1.29	1.9% 5.2%	100% 100%	99.8% 99.5%
Light brazing.	3	0.86	14.%	99%	98%
Bull ladlemen, spot, flash, and seam welding.	CALOBAR Extra Dark Dark	0.70 0.46	20% 35%	100% 100%	95% 92%
Employees in area of electric welding, stray or reflected light, low temperature fire box observations, rivet heaters, ladlemen, hand pourers.	Medium	0.28	53%	100%	80%

†These numbers are from the Bureau of Standards density formulas.

1939 Developments In Industrial Heating Equipment

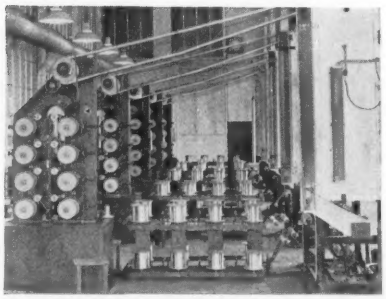
By C. L. Ipsen,
Industrial Department,
General Electric Company, Schenectady, N. Y.

New Control for Electric Heating Equipment

A NEW system for automatically regulating the power input to electrically heated equipments, such as furnaces, boilers, superheaters, and air heaters, has been announced by General Electric. Called the Reactrol system, this new means of control regulates power input by varying the voltage impressed on the heating resistors in accordance with temperature or pressure requirements. It is particularly suitable for continuous processes and in the treatment of materials that might be affected by slight changes in temperature.

✦ ✦ ✦

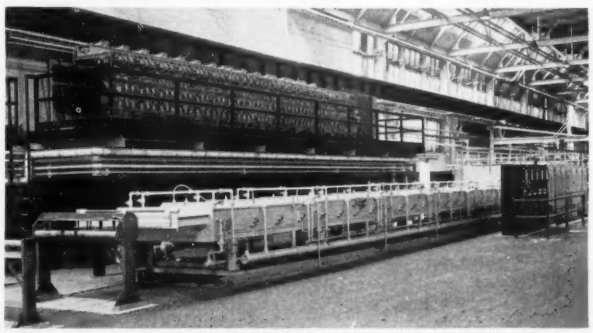
IN its simplest form, the Reactrol system consists of a control panel, a temperature or pressure control instrument, and a saturable-core reactor. In operation, the pressure or temperature control instrument (which contains a special potentiometer) feeds low-voltage current into an amplifying tube on the control panel. This tube in turn regulates the flow of direct current to the saturable-core reactor which, acting like a valve, regulates the voltage applied and thus the amount of power going to the electric heating equipment. Thus, the Reactrol system provides accurate and rapid temperature or pressure control with practically no overshooting.



16-Head "Type I" Wire Enameling Machine, Electric Oven, and Bare-Wire Stand. On 3rd floor in building 50-B of G-E River Works at West Lynn, Mass. ✦ ✦ ✦

Steel Strip Annealing with "Catenary-type" Furnace

MARKING or scratching the surface of bright steel strips is avoided in a new type continuous furnace arranged to support the strips on rolls outside the heating chamber at each end, where they as well as the strip are relatively cool. The strip hangs in a free catenary between the rolls, so the high-temperature portion of the strip is untouched by a supporting means. If the rolls are in the heating chamber, marks or scratches are likely to occur.



G-E Catenary-Type Electric Furnace, equipped with Reactrol Temperature Control System, used for normalizing steel strip. Heating chamber 31 ft. long, 5 ft. active width, cooling chamber 60 ft. long. 460 kw., 220 volts, 3-phase. Oblique delivery-end view. ✦ ✦ ✦

THE new furnace, designated as a catenary type, has the usual extended cooling chamber to cool the strip below oxidizing temperature before it emerges, and also has the necessary feed-in rolls and coiling reels. The 460-kw heating chamber is 30 ft. long and 5 ft. wide, and operates at 2000 F. Reactrol control is employed, with a temperature-control instrument for each of the four zones.

✦ ✦ ✦

Wire Enameling Oven

ECONOMY in operation, smoothness of operation, uniformity of product, and increase in wire speed were achieved in new oven equipment for enameling wire. For the manufacture of the new Formex magnet wire it was necessary to develop new equipment and methods for applying and baking the coating on the wire since the insulation has high viscosity and is applied by pulling the wire through a die rather than by the conventional dip method. Several sizes and types of ovens, all with Calrod heating units, were developed for baking the insulation film on the wire. A horizontal oven is used for wire sizes No. 31 gage and smaller and a vertical oven for No. 30 gage and larger.

✦ ✦ ✦

A TYPICAL equipment consists of a 14-kw

(*Please turn to Page 184*)

Handling Blue Prints and Sketches In The Factory

By James L. Courtney,
London, England

A system for the correct filing and easy handling of wire mill blue prints and sketches as used in a large British plant. ✦ ✦

IT is usual to find in a Wire manufactory that a large number of blue prints and sketches are used in different phases of the organization. Apart however, from internal use it is frequently necessary to quote potential customers for products according to a design shown on a sketch or to conform with a blue print supplied by the customer.

✦ ✦ ✦

THE handling of these blue prints and sketches in an efficient manner is a matter which requires care and attention if increased clerical work and loss of time are to be avoided, as well as inconvenience to the customer at a later date.

✦ ✦ ✦

THE system discussed by the writer in this present paper is one that has been used with success in several large organizations connected with the Wire Industry.

✦ ✦ ✦

FILING Must be Centralized. The Drawing Office itself should have some form of annex attached where all blue prints and sketches of any nature can be filed. Most drawings that reach a factory are, as a rule, quite confidential and consequently important, and the recipients, therefore, are responsible for them to a great extent. A firm rule should be made therefore, that all original blue prints and sketches, immediately upon receipt, should be passed to the Drawing Office, where they should be numbered and cross-indexed. (Fig. 1). It is suggested at this point that a useful method of cross-indexing is to quote the customer's reference number together with the company's own reference number, which would then read as follows:—"Customer's reference / Company's reference".

✦ ✦ ✦

STRICT numerical order (Company's reference number) should be the basis for filing these blue prints and sketches, and a cross-index should be carried in a book, alphabetically, under the names of customers.

✦ ✦ ✦

WHEN copies of drawings are required, the practice is usually used today of taking a fixed number of copies by means of a Photostatic machine. In cases where quotations have to be obtained from outside sources for the cost of equipment and tools, it is suggested that five copies of each blue print or sketch should be produced; each of these copies, of course, bearing the dual reference number. These copies should be sent to the Estimating department who, in turn, would contact with the productive section. A brief specification of the equipment or tools required would then be drawn up, and this, together with three or four copies of the original blue print, would be sent to the Purchasing department. In this way the Purchasing department is enabled to issue enquiries or tenders to three or four possible suppliers the same day, which would naturally be advantageous when competitive prices are urgently required.

✦ ✦ ✦

A DEFINITE rule should also be made that all surplus copies of sketches, etc., be destroyed, as to leave numerous copies of these documents lying about merely creates confusion and permits the possibility of them falling into the wrong hands.

✦ ✦ ✦

IN the smaller type of organization some allowance will have to be made if a demand for four or five copies of every sketch or blue print received creates an unreasonably heavy burden on the Drawing Office staff and on the photostatic machine. In such cases it would be quite satisfactory to leave the

Cross Index for Filing of Drawings, etc.

Date Rec'd:	Customer	Article	Customer's Reference Number	Company's Number
				200
				201
				203
				204
				205
				206
				207
				208
				209
				210

(Fig. 1)

decision to the Estimating department as to whether copies of such sketches are necessary. If only a small or cheap tool is required, obviously the production of numerous copies is not called for.

✦ ✦ ✦

A VERY useful attachment in certain types of photostatic machines today, is a device which enables the Drawing Office to prepare, where necessary, miniature reproductions of the actual sketch submitted by the customer. Not only does this give greater ease of handling, but creates a saving in the cost of paper used for copies, this latter often proving a considerable item of expense.

✦ ✦ ✦

TO cover the movement of the Enquiry Form from the Estimating department (after contact with the factory department) to the Purchasing section, a form can be used as shown in Fig. 2.

✦ ✦ ✦

IN some sections of the Wire industry a tendency has been prevalent, in recent years, to regard the purchasing of equipment and tools generally as a highly specialized job, with the result that the actual function of purchasing has been transferred from the Buying to the Engineering department. This may be a change for the better from some points of view, but the principle, in the writer's opinion, is not good. Whilst the Buying department does not expect to have the specialized engineering knowledge required to handle actual negotiations with regard to the purchase of plant and equipment, the sectionalizing of this department means, in effect, a duplication of the buying function itself. Again whether the Engineering department in a factory is equipped or qualified to deal with the purchasing of equipment from the point of view of price, is a matter of some doubt.

Enquiry to Purchasing Section
(From Estimating Dept.:)

Date ..... **No.** .....

Drawing Reference .....

Article .....

Works Specification of Tools, etc. Required:

Estimating Dept.: Allowance of Cost:

(Fig. 2.)

WIONEERS

Begin in a dream, develop with care,
Then work out with painstaking thought,
This always is true
Before we can do
The job in the world that we ought.

The metals unused the pioneers found,
And although the vision was dim,
Determined to try,
Ignoring the cry
Of those who poured scorn on their whim.

They first made the strip, and from it the wire,
With hammer and sweat of their brow,
They planned and they worked,
Hardships were not shirked,
To reach the stage where we stand now.

We've found out a lot, since those far-off days,
But let us not think that we're through,
There's service ahead
For all who will tread
The road that the pioneers knew.

Wire serves man at sea, on land and in air,
In comfort, and easing his task,
It lightens the load
On many a road
What better reward can we ask?

FRANK WHITELEGG.

"THE MACHINES THAT PUT THE 'RINGS' IN SPRINGS"

200 SPRINGS per MINUTE!

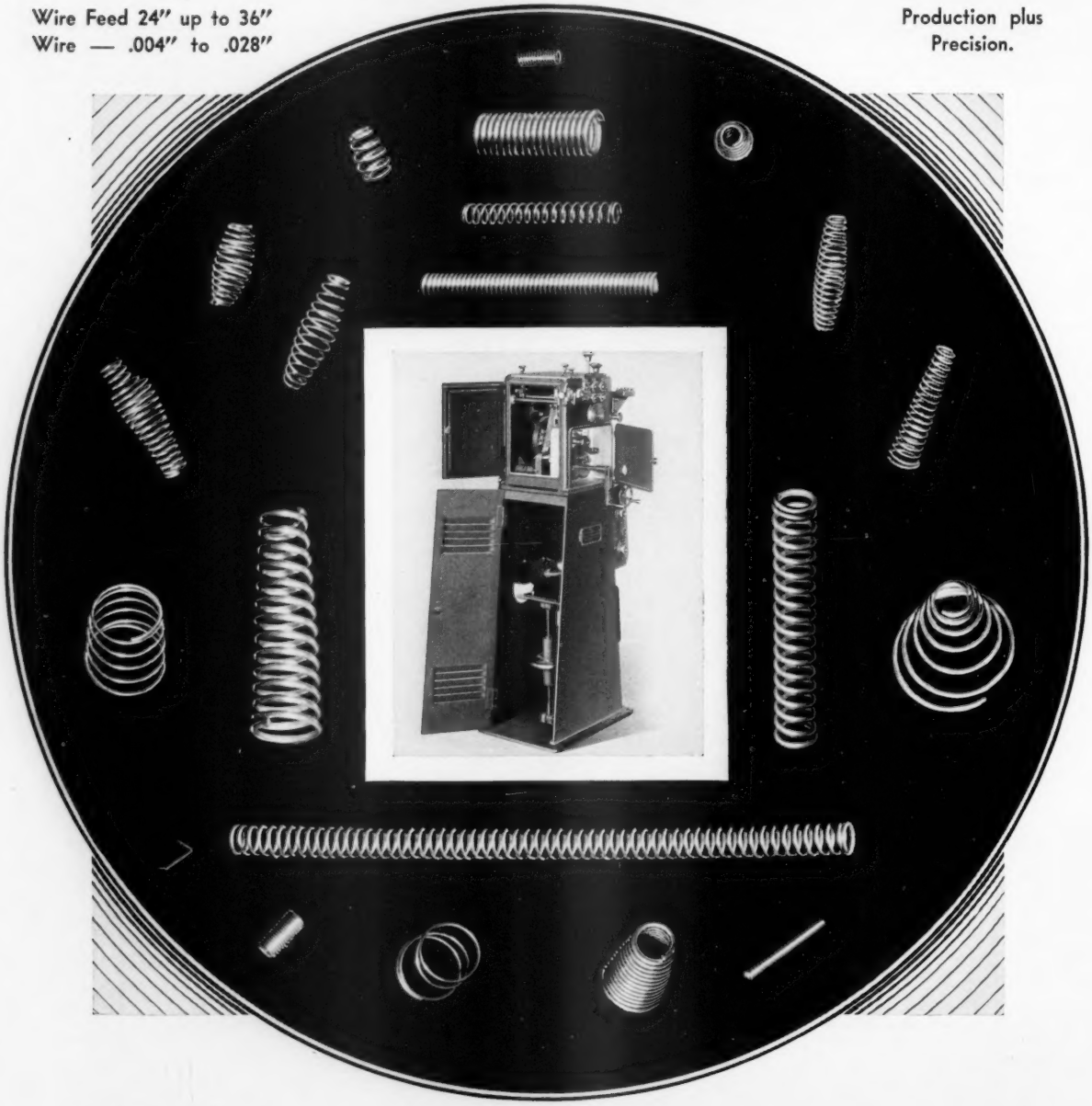
on the new

No. "0" Universal Spring Coiler

Segment Type — Series 668

Wire Feed 24" up to 36"
Wire — .004" to .028"

Production plus
Precision.



REMOVABLE CAM-HUB

Both pitch and diameter cams may be shaped, timed and affixed to the cam-hub which, as an entire single unit, may be removed from the shaft without losing the timed relations. One-piece solid cams can be used on this removable cam-hub.

SLEEPER & HARTLEY, Inc.

DESIGNERS AND BUILDERS

WORCESTER, MASSACHUSETTS, U. S. A.

Standard Improves Weather Resistance of Coverings for Aerial Wire and Cable

By L. L. Carter,
Anaconda Wire & Cable Company,
New York

and

Alfred Bellis,
John A. Roebling's Sons Company,
Trenton, N. J.

A technical committee, appointed by the general ASA committee to study the immediate problems connected with weather-resistant coverings for aerial wire and cable, prepared the new standard specifications which were approved by the ASA committee on wire and cable, and recommended by that committee to the American Standards Association for approval as American Standard. This technical committee cooperated with the Insulated Power Cable Engineers Association in order to make the new standard and the corresponding IPCEA specifications agree. ✦

RUBBER-INSULATED aerial wire and cable with weather-resistant covering, whether used by the electric light and power companies, railroads, communication companies, or industrial plants, must withstand the weathering elements over a wide range of climatic conditions and temperature.

✦ ✦ ✦

LIGHT and power distribution, railway signal, police fire alarm, telegraph and telephone drop wire circuits are common examples of overhead outdoor applications of wire and cable for which weather-resistant coverings meeting the requirements of this new standard are recommended. It is not intended that these specifications shall apply to wires and cables to be installed in duct systems or for burial underground.

Courtesy Industrial Standardization, publication of the American Standards Association.

✦ ✦ ✦

WHILE several different types of protective covering may be specified over the rubber-insulated conductors, the most usual type of outer covering is a cotton braid, of no particular texture or weight, made weather resistant by the use of bituminous saturating and finishing compound. For more than 50 years all of these cables looked more or less alike, having as the outside covering a brightly polished black compound made up from a blend of waxes and bituminous material.

✦ ✦ ✦

"WEATHERPROOF" became the commonly accepted description for the finish on any cable which had a bright black outside surface, regardless of whether this cable might have rubber insulation, varnished cambric insulation, or the double or triple braid covering of Weatherproof Wire. Weatherproof finish was specified without specific discrimination as to whether the material was to be used within buildings in open wiring or in conduit, whether it was to be installed outdoors on

Wire and cable coverings are here subjected to normal weathering conditions. Observations taken at regular intervals determine their weather-resistant properties and help in developing improved materials and processes. ✦ ✦ ✦

poles or between buildings, whether it was to be drawn into an underground duct system or be buried directly in the earth except as could be judged from the order or purchase specification. It is readily apparent that confusion frequently resulted from the almost universal reference to these finishes as weatherproof.

✦ ✦ ✦

A SOMEWHAT similar situation developed after the introduction of the pitch-base flame-retardant moisture-resistant finish for rubber-covered wire and cable required for 600-volt wire under the National Electrical Code. For many years braided covering filled with white, gray, black, or red lead base paint had been referred to as flameproof although it was recognized technically and commercially as slow-burning finish. With both of these types of finishes available it was uncertain which finish was desired when the purchaser of wire and cable merely specified flameproof finish, except that on rubber-insulated products the slow-burning paint finishers were not commonly used; however, it was frequently used on varnished-cambric insulated wire and cable for central and substation circuits. While this is a good flame-retardant finish and can well be used in high-temperature locations it is not highly moisture resistant.

✦ ✦ ✦

AS a result of these distinctions, greater attention was given the materials and methods used in saturating and finishing protective braids on wire and cable, and it became necessary to clarify the situation as to the types of materials which might be applied to best advantage on cables with different insulation for different classes of service.

✦ ✦ ✦

A DECIDED stimulus to such work of clarification came from the early development work in the communications industry, to provide more durable weather-resisting finish for the braid covering used on telephone drop wire. The development and general acceptance of the improved type of Weatherproof Wire, known as URC Type, as provided by the American Tentative Standard for Weather-Resistant (Weatherproof) Wire and Cable, URC Type (C8.18-1936) stimulated a demand for the application of this same class of protective materials to the braid covering of insulated wire and cable for aerial service.

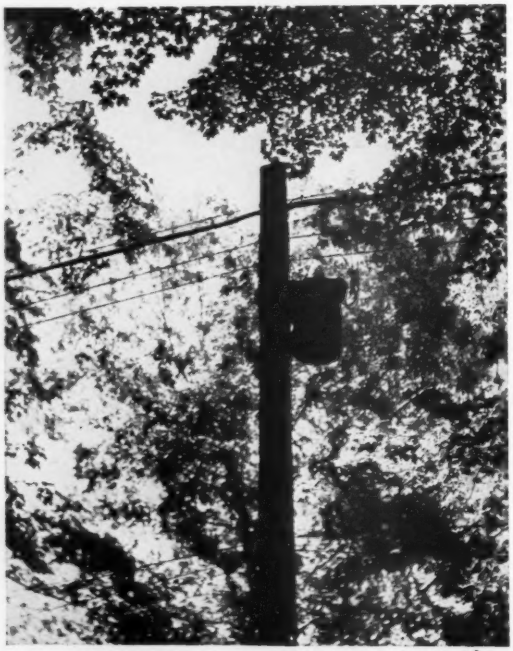
✦ ✦ ✦

FOR a considerable time orders for rubber-covered wire were placed which specified URC finish. This made it necessary to make clear to the users of wire and cable that the cotton braid on rubber-insulated and varnished-cambric insulated wire and cable were processed with a saturant and a finishing compound quite distinct from those used in the manufacture of double and triple-braid weatherproof-wire Type URC. It is not practical to apply the URC weatherproof wire saturant to insulated wire and cable generally because of the viscosity characteristics and the high temperatures required for the thorough penetration of the saturant.

✦ ✦ ✦

THE URC type of finish can be applied to any type of saturated fibrous-covered wire and cable. However, this finish is distinctive by reason of the material used and the heavier application of coating than is customary with moisture-resistant finish for rubber-insulated wire and cable.

(*Please turn to Page 175*)



Aerial rubber-insulated cable is also used in distribution of electrical power. ✦ ✦ ✦ ✦

Aerial rubber-insulated cable is used in electrical control of railway signals. ✦ ✦ ✦ ✦

Reactive Wire Drawing In Practice

By H. A. Stringfellow
New York, N. Y.

DURING the past four months investigations have been in progress as to the effect of Reactive Drawing on the mechanics of drawing wire and of the effect this method of drawing has on the physical properties of the wire. The results of these investigations are of the greatest interest and importance.

✦ ✦ ✦

WIRE was drawn on an Experimental Reactive Wire Drawing Machine, so constructed that the reactive load on the wire is a fixed proportion of the pull of the drawing block during any test. (The pull ratio may be varied by adjusting the machine). The experimental machine is equipped with a dynamometer die holder which indicates directly the die pressure during a test.

✦ ✦ ✦

EXPERIMENTS were made with steel wires of various analyses and in various conditions as to heat treatment, and the accompanying tables show typical results obtained with a .60 carbon wire which was patented before drawing.

✦ ✦ ✦

IT is interesting to note that, in all tests, the reactive die pressure was not affected by the speed of drawing. The speed, during a test, was increased from 55 ft. per min. to 540 ft. per min. with no alteration in the die pressure. It was also noted that the speed of drawing, apparently, had no effect on the physical properties of the wire, as determined by tests made from different parts of the drawn bundle.

FROM the tests which have been made, the following conclusions may be drawn:

I—By drawing reactively, die pressures are reduced from 20% to 40%, depending upon the amount of reactive load which is applied to the wire. The reduction in die pressure varies inversely as the amount of reactive load, but not as the first power of the load.

II—The reactive die pressure is independent of the speed of drawing. This fact permits substantial increases in drawing speeds over those commonly used today, with consequent increase in production. An accompanying result is considerably increased die life, at increased speed of production over that which is attainable with present methods of drawing.

III—The above results point to a considerable reduction in the cost, per ton, of wire produced.

IV—The physical properties of reactive-

(Please turn to Page 169)

TABLE I
TESTS ON .60 CARBON WIRE, PATENTED AND DRAWN FROM .085" DIAMETER

Draft	Drawn on 9" Reactive Ring				
	% Red.	% Total Red.	Conventional Die Pressure	Reactive Die Pressure	% Red. in Die Pressure
.085 - .072	28	28	340	204	40
.072 - .060	30	50	290	200	31
.060 - .050	30	65.5	218	140	35.8
.050 - .042	29	70.6	160	104	35
.042 - .036	26	82	120	70	41.7
.036 - .030	30	87.5	98	60	38.9

TABLE II

Draft	Drawn on 14½" Reactive Ring				
	% Red.	% Total Red.	Conventional Die Pressure	Reactive Die Pressure	% Red. in Die Pressure
.072 - .060	30	50	290	230	20.7
.060 - .050	30	65.5	218	170	22
.050 - .042	29	70.6	160	130	18.7
.042 - .036	26	82	120	90	25
.036 - .030	30	87.5	98	80	18.4

TABLE III

Physical Properties of .60 Carbon Wire .030" Diam. Reduced from .085" Diam. by Reactive Drawing and Conventional Drawing. Wire was Patented Before Drawing

	Tensile	Torsion	Bend
Conventional Drawing	233,000	37	40
Reactive on 9" Ring	273,000	43	40
Reactive on 14½" Ring	262,000	43	58

New Type Nickel Fish Hooks

The development of a fish hook containing 98% pure nickel to resist corrosion by salt and fresh water, combined with steel-like strength suitable for use for big game fish marks a decided advance in this phase of wire product manufacturing. ✦ ✦

A MANUFACTURER of fish hooks at Albany, N. Y., has announced a development, which anglers of all kinds and especially those whose preference turns to salt water fishing, regard as one of the most interesting the hook and bait industry has witnessed in many years.

✦ ✦ ✦

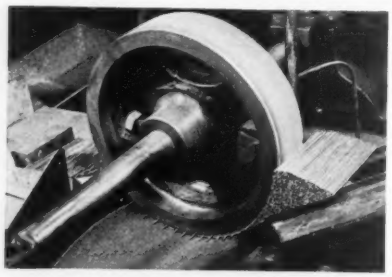


Fig. 1. After coiled "Z" Nickel wire is automatically straightened and cut into the desired lengths, production of the fish hook at Bill DeWitt Baits plant in Auburn, begins with the grinding of the point. This is accomplished by passing the cut blanks over a sharpening wheel.

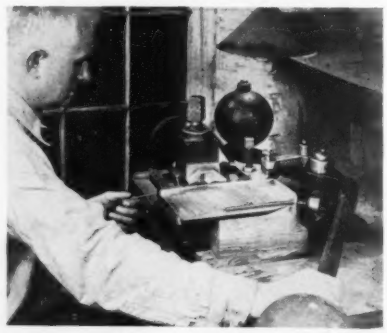


Fig. 2. Special equipment is used to cut the barb, after pointing. The metal is tough and strong as well as rustproof. ✦ ✦ ✦

THIS is the production on a commercial basis of a rustproof hook with steel-like strength made of "Z" nickel, a new heat-treatable alloy containing approximately 98 per cent nickel. Introduction of the hook follows metallurgical research covering several years and manufacturing studies of many months, both in this country and abroad, where experimental production previously had indicated the practical value of the alloy for this purpose.

✦ ✦ ✦

CORROSION protection in salt water in the past chiefly has been limited to plated or otherwise coated hooks. The materials which were able to withstand sea water corrosion adequately for the most part failed to provide the physical properties required in hooks. Corrosion resistance of the new hooks extends all the way through the metal and is not limited to surface protection.

✦ ✦ ✦

Fig. 5. While there are several methods for testing a hook, many craftsmen producing "Z" Nickel and other higher quality hooks, prefer to make their tests by hand. Experience has taught them to gauge accurately the force to be applied to each size hook. ✦ ✦ ✦ ✦ ✦

BESIDES representing something entirely new in fishing equipment, the new nickel hook comes as a definite effort on the part of American industry to capture more completely a field in which foreign producers have shared generously. During 1938, the total value of imported hooks

Fig. 3. Here the pointed and barbed blank is bent around a die to provide the required shape. Separate dies, shown in the left foreground, are required for each hook type or design. The present line of nickel alloy hooks are produced in 5 O'Shaughnessy sizes. ✦ ✦ ✦ ✦

Fig. 4. The eye of the hook is made after other operations are completed in a machine which like others used by the industry is of special design and construction. ✦ ✦ ✦ ✦

reached almost $300,000, many of them representing products of higher qualities. According to the latest figures available, this sum represents about 33 per cent of the total fish hook sales in the United States.

(Please turn to Page 174)

STATISTICS --- 4th QUARTER --- 1939

PRODUCTION FOR SALE OF IRON AND STEEL PRODUCTS

35-300-3&9

AMERICAN IRON AND STEEL INSTITUTE
Capacity and Production for Sale of Iron and Steel Products

Fourth Quarter - 1939
PERIOD

		Number of companies	Items	Annual Capacity Gross tons	Production for Sale—Gross Tons: Current Quarter: Total	Current Quarter: Per cent of capacity	Current Quarter: Shipments: Export	Current Quarter: Shipments: To members of the industry for conversion into further finished products	To Date (12 Months 1939): Total	To Date: Per Cent of capacity	To Date: Shipments: Export	To Date: Shipments: To members of the industry for conversion into further finished products
STEEL PRODUCTS	Ingots, blooms, billets, slabs, sheet bars, etc.	32	1	xxxxxxx	1,297,455	xxx	211,961	741,758	3,113,274	xxx	293,933	1,947,322
	Heavy structural shapes	8	2	4,796,800	775,836	64.7	36,668	-	2,271,888	47.4	104,212	xxxxxxx
	Steel piling	4	3	309,300	42,788	55.3	2,180	-	153,061	49.5	9,618	xxxxxxx
	Plates—Sheared and Universal	19	4	5,828,310	942,744	64.7	49,860	9,631	2,515,274	43.2	210,214	20,812
	Skelp	7	5	xxxxxxx	225,254	xxx	49,410	132,227	573,061	xxx	76,362	370,821
	Rails—Standard (over 60 lbs.)	4	6	3,395,300	241,265	28.4	1,256	-	1,037,489	30.6	8,951	xxxxxxx
	Light (60 lbs. and under)	6	7	418,500	27,753	26.5	3,920	-	79,151	18.9	18,196	xxxxxxx
	All other (Incl. girder, guard, etc.)	2	8	105,000	12,771	48.7	4,141	-	32,554	31.0	6,578	xxxxxxx
	Splice bar and tie plates	14	9	1,290,550	115,337	35.7	1,672	-	416,292	32.3	5,411	xxxxxxx
	Bars—Merchant	35	10	xxxxxxx	1,198,115	xxx	27,658	138,169	3,218,519	xxx	102,784	342,955
	Concrete reinforcing—New billet	14	11	xxxxxxx	276,155	xxx	40,924	-	927,633	xxx	82,460	xxxxxxx
	Rerolling	19	12	xxxxxxx	41,178	xxx	6,868	-	156,476	xxx	12,949	xxxxxxx
	Cold finished—Carbon	18	13	xxxxxxx	189,375	xxx	1,781	-	529,030	xxx	6,174	xxxxxxx
	Alloy—Hot rolled	15	14	xxxxxxx	243,323	xxx	6,938	21,447	686,768	xxx	19,084	59,695
	Cold finished	14	15	xxxxxxx	20,061	xxx	27	-	59,271	xxx	196	xxxxxxx
	Hoops and baling bands	5	16	xxxxxxx	19,589	xxx	957	-	64,502	xxx	1,682	xxxxxxx
	TOTAL BARS	33	17	11,595,470	1,987,796	68.6	85,153	159,616	5,642,199	48.7	225,329	402,648
	Tool steel bars (rolled and forged)	15	18	94,160	13,658	58.0	842	-	40,283	42.8	3,397	xxxxxxx
	Pipe and tube—B. W.	15	19	1,626,800	286,706	70.5	19,904	-	850,870	52.3	40,538	xxxxxxx
	L. W.	11	20	1,316,580	105,071	31.9	10,025	-	320,463	24.3	17,352	xxxxxxx
	Electric weld	5	21	638,400	68,751	43.1	8,620	-	238,671	37.4	13,771	xxxxxxx
	Seamless	15	22	2,968,900	524,490	70.7	47,208	-	1,505,951	50.7	104,246	xxxxxxx
	Conduit	7	23	165,670	22,330	53.9	826	-	70,402	42.5	2,138	xxxxxxx
	Mechanical Tubing	6	24	265,600	49,936	75.2	2,727	-	143,627	54.1	5,058	xxxxxxx
	Wire rods	19	25	xxxxxxx	254,683	xxx	15,513	67,724	706,571	xxx	34,232	215,464
	Wire—Drawn	38	26	1,970,195	414,828	84.2	24,666	9,347	1,228,087	62.3	65,692	18,272
	Nails and staples	19	27	1,080,760	176,718	65.4	15,827	-	606,059	56.1	34,324	xxxxxxx
	Barbed and twisted	16	28	428,075	60,340	56.4	19,627	-	206,269	48.2	53,309	xxxxxxx
	Woven wire fence	15	29	695,330	61,487	35.4	434	-	244,282	35.1	1,766	xxxxxxx
	Bale ties	11	30	110,680	11,601	41.9	25	-	53,167	48.0	92	xxxxxxx
	All other wire products	5	31	24,380	1,788	29.3	-	-	5,148	21.1	16	xxxxxxx
	Fence posts	12	32	131,700	16,021	48.7	138	-	53,963	41.0	1,171	xxxxxxx
	Black plate	12	33	462,815	118,490	102.4	2,531	41,387	365,169	78.9	7,594	124,686
	Tin plate—Hot rolled	10	34	1,527,360	202,369	53.0	61,250	-	576,162	37.7	118,361	xxxxxxx
	Cold reduced	10	35	1,936,200	519,607	107.3	89,502	-	1,710,848	88.4	211,499	xxxxxxx
	Sheets—Hot rolled	26	36	xxxxxxx	1,568,654	xxx	60,505	86,833	4,343,727	xxx	223,954	206,124
	Galvanized	16	37	xxxxxxx	379,829	xxx	34,816	-	1,245,466	xxx	108,943	xxxxxxx
	Cold rolled	18	38	xxxxxxx	630,869	xxx	15,200	-	1,805,231	xxx	89,104	xxxxxxx
	All other	16	39	xxxxxxx	136,877	xxx	4,353	-	405,153	xxx	16,769	xxxxxxx
	TOTAL SHEETS	27	40	11,374,065	2,716,229	95.5	114,874	86,833	7,799,577	68.6	438,770	206,124
	Strip—Hot rolled	24	41	3,137,300	465,291	59.3	16,399	62,524	1,207,906	38.5	40,023	171,734
	Cold rolled	36	42	1,156,910	220,999	76.4	4,140	-	603,926	52.2	11,467	xxxxxxx
	Wheels (car, rolled steel)	5	43	380,320	56,922	59.9	957	-	134,598	35.4	5,266	xxxxxxx
	Axles	5	44	425,900	33,683	31.6	2,055	-	66,045	15.5	5,489	xxxxxxx
	Track spikes	11	45	300,100	33,057	44.1	875	-	106,892	35.6	2,260	xxxxxxx
	All other	4	46	9,450	3,151	133.4	-	-	8,682	91.9	101	xxxxxxx
	TOTAL STEEL PRODUCTS	136	47	xxxxxxx	12,107,205	xxx	905,166	1,311,047	34,687,861	xxx	2,176,736	3,477,883
	Estimated total steel finishing capacity based on a yield from ingots of 70.0%	-	48	48,514,000	xxxxxxx	89.0	xxxxx	xxxxxxx	xxxxxxx	64.3	xxxxxxx	xxxxxxx
IRON PRODUCTS	Pig iron, ferro manganese and spiegel	28	49	xxxxxxx	1,566,570	xxx	60,346	673,119	4,253,788	xxx	136,020	1,278,404
	Ingot moulds	4	50	xxxxxxx	152,953	xxx	904	-	361,616	xxx	1,712	xxxxxxx
	Bars	9	51	147,200	13,225	35.9	16	718	34,123	23.2	103	1,958
	Pipe and tubes	3	52	97,730	10,996	45.0	218	-	40,640	41.6	745	xxxxxxx
	All other	2	53	65,560	4,011	25.2	807	1,680	13,873	21.8	2,443	5,247
	TOTAL IRON PRODUCTS (ITEMS 51 to 53)	11	54	250,530	28,232	45.1	1,041	2,398	88,636	35.4	3,291	7,205

Total number of companies included --- 157

Total steel products produced for sale, less shipments to members of the industry for conversion into further finished products Current quarter 10,796,158 *G.T.;* 89.0 *% of Finishing Capacity.*
To date 31,209,978 *G.T.;* 64.3 *% of Finishing Capacity.*
The above tonnages represent 70.0 *% of the ingots produced by companies whose products are included above.*

If You Are Not A Member Of The Wire Association—Now Is A Good Time To Join!
The Annual Dues Are $10.00
For detailed information address
RICHARD E. BROWN, Secretary
THE WIRE ASSOCIATION
300 Main Street, Stamford, Conn.

Outstanding Personalities of the Wire Industry

Charles G. Williams, General Manager, John A. Roebling's Sons Co.

CHARLES G. WILLIAMS, formerly vice president in charge of purchasing and manufacturing operations for the 15 plants of the American Chain and Cable Company, Inc., has been appointed general manager of the John A. Roebling's Sons Company, Trenton, N. J.

✦ ✦ ✦

MR. WILLIAMS was born in Hartford, Conn. on August 25, 1885. He attended the Phillips Andover School in Andover, Mass. and later received his degree in Mechanical Engineering from the Sheffield Scientific School, Yale University, Class of 1908.

✦ ✦ ✦

AFTER leaving college, he was employed for a time by the Terry Steam Turbine Company of Hartford, Conn. as a member of their engineering department.

✦ ✦ ✦

IN January 1913, he was made purchasing agent of the American Chain and Cable Company plant at Oneida, N. Y. Shortly after the acquisition of the Standard Chain Company in 1916, he was appointed general purchasing agent of all plants of the company and was, in 1928, made general production manager. In 1930, he was made a director of the company and, in 1936, was appointed vice president in charge of all manufacturing operations in the 15 plants of the company.

✦ ✦ ✦

L. A. Mullen, Assistant Sales Manager, Pittsburgh Steel Co.

L. A. MULLEN has been appointed assistant manager of sales for Pittsburgh Steel Company effective January 1, 1940.

✦ ✦ ✦

MR. MULLEN has been associated with the Pittsburgh Steel Company for the past two years; first, as assistant district sales manager at New York and later as direct sales manager at Chicago. Previously he had been with Republic Steel Corporation for ten years in various sales capacities.

✦ ✦ ✦

George C. Moon, General Sales Manager, American Chain and Cable Co.

GEORGE C. MOON, a vice president of American Chain & Cable Company, Inc., has been appointed general manager of sales of the company. Mr. Moon is regarded as one of the most prominent men in the wire rope industry and his association with that field extends back for many years.

✦ ✦ ✦

AFTER operating the George C. Moon Company for a number of years, he became vice president of the American Cable Company when it absorbed the George C. Moon Company. He became associated with American Chain & Cable Company, Inc., about 14 years ago when that concern took over the American Cable Company.

✦ ✦ ✦

Sidney D. Williams, Vice President Sales, Copperweld Steel Company

SIDNEY D. WILLIAMS has been appointed vice president and in charge of sales of Copperweld Steel Co.'s new steel division at Warren, O.

✦ ✦ ✦

FOLLOWING graduation from Lehigh University in 1913 he worked in various departments at Homestead steelworks of the former Carnegie Steel Co., subsequently serving as superintendent, open hearth department, Central Iron & Steel Co., Harrisburg, Pa.; superintendent of open hearth department and chief metallurgist, Pittsburgh Crucible Steel Co., Midland, Pa.

✦ ✦ ✦

FROM 1926 to the present, he has been, respectively, metallurgical sales engineer, assistant director of sales, manager of tube sales and director of sales for Timken Steel & Tube division, Timken Roller Bearing Co., Canton, O.

C. N. Johns, Vice President, Operations, American Chain & Cable Co.

C. N. JOHNS, vice president of American Chain & Cable Company, Inc., has been placed in charge of operations, to take over the duties of C. G. Williams, a vice president, whose resignation is announced.

✦ ✦ ✦

MR. JOHNS is a graduate of the University of Missouri. His 27 years with the company were interrupted only during the World War while he was in the service. As vice president in charge of operations he will supervise the manufacturing activities of the company's 14 plants, in Connecticut, Pennsylvania, New Jersey, Michigan, Indiana, Texas and Canada.

✦ ✦ ✦

J. M. Cosgrove, Director of Development, Standard Steel Spring Co.

THE appointment of **Mr. J. M. Cosgrove** as Director of the Development Laboratory, Standard Steel Spring Co., Corapolis, Pa., has been announced. Mr. Cosgrove will be actively interested in research on the new corrosion proof coating developed by the Company.

✦ ✦ ✦

MR. Cosgrove was formerly Chief Chemist of Noblitt-Sparks Industries, Inc., and before that, Process Control Engineer for the Meaker Company, Development Engineer in charge of plated finishes for Western Electric Company.

✦ ✦ ✦

MR. Cosgrove graduated from the Massachusetts Institute of Technology as an electrochemical engineer. He also has a degree from Manhattan College. He has written a number of papers on cleaning and finishing problems in the coating of metals and is well known in this industry.

(Please turn to Page 181)

Exports and Imports of Wire

Exports of Iron and Steel Wire Products in Dec. 1939 and Dec. 1938
(In gross tons)

	DEC. 1939	NOV. 1939	DEC. 1938
Wire rods	6,820	4,236	307
Strip steel	12,872	9,865	6,807
Plain, black or galvanized iron or steel wire	9,481	6,974	4,607
Barbed wire and woven wire fencing	7,413	6,861	3,955
Woven wire screen cloth	168	246	111
Wire rope	916	548	342
Insulated iron or steel wire and cable—see analyses below			
Other wire and manufactures	2,109	1,195	726
Wire nails	4,520	4,210	2,599
Tacks	117	33	25
Other nails, including staples	558	826	188
Bolts, machine screws, nuts, rivets and washers	1,129	963	749
Total, these 11 classifications	46,103	35,957	20,416

Imports of Iron and Steel Wire Into the United States
(In gross tons)

Concrete Reinforcement bars		15	317
Hollow bar and drill steel	100	71	48
Wire rods	1,058	917	480
Barbed wire	325	174	738
Round iron and steel wire	269	166	264
Telephone and telegraph wire	1		11
Flat wire and strip steel	335	226	295
Wire rope and strand	106	121	114
Other wire	8	45	73
Hoops and bands	265	363	2,143
Nails, tacks and staples	171	162	677
Bolts, nuts and rivets	18	9	5
Total, these 12 classifications	2,651	2,269	5,165

Exports of Insulated Wire and Cable, December, 1939

	Foreign		To U. S. Possessions	
	Pounds	Dollars	Pounds	Dollars
Rubber-covered wire	833,215	$177,129	132,452	$ 31,519
Weatherproof wire	302,273	53,665	75,248	12,380
Other insulated copper wire	1,196,488	281,601	385,223	72,155
Nickel-chrome electric resistance wire	73,450	85,669	.....	.....
Total, these 4 classifications	2,405,426	$598,060	592,923	$116,054

Imports

FOR the third consecutive month, imports of iron and steel products into the United States registered a decline. Preliminary figures report the December trade as 13,442 gross tons valued at $1,099,177 against November's 14,379 tons valued at $1,005,774 and as compared with the trade of December 1938—22,248 tons valued at $1,405,704.

✦ ✦ ✦

THE chief product imported in December in point of tonnage was spiegeleisen—5,767 tons—of which Canada supplied 5,417 tons and Norway 350. Pig-iron receipts totaled 1,318 tons, including 1,185 from India and 133 from Canada, while Norway was the sole source of the 1,285 tons of ferromanganese received from Sweden of all but 1 ton of the 1,058 tons of wire rods imported.

✦ ✦ ✦

LEADING countries sending iron and steel products to the United States during the month were Canada, 5,741 tons; Sweden, 2,729; Norway, 1,712; Belgium, 1,666; and British India, 1,185.

✦ ✦ ✦

DURING 1939 imports of iron and steel products into the United States totaled 285,669 tons valued at $17,364,761—up 19 percent in quantity and 15.8 percent in value over 1938, when this trade totaled 240,099 tons valued at $15,000,483.

✦ ✦ ✦

BELGIUM, 73,524 tons, was the chief source of these imports in 1939, followed by Canada, 52,904 tons; Germany, 47,731; British India, 24,840; Sweden, 24,037; and Norway, 20,877. Leading products, in point of tonnage, were structural shapes, 39,065; pig iron, 38,592; spiegeleisen, 38,562; and ferromanganese, 33,415.

✦ ✦ ✦

A TOTAL of 1,267 tons of iron and steel scrap valued at $15,473 was imported in December—a material increase over the 837-ton, $4,817 trade, of November, but far short of the 6,519-ton, $76,649 figure of December 1938. Canada supplied 1,217 tons of the December 1939 total.

✦ ✦ ✦

SCRAP imports were also up for the 1939 calendar year at 29,492 tons valued at $301,513, against the 24,451-ton, $281,240, trade of 1938. Canada was the source of 27,208 tons of the 1939 receipts.

✦ ✦ ✦

Exports

DECEMBER saw further gains registered by the export trade in iron and steel products (scrap excepted). Preliminary figures report this trade at 394,035 gross tons valued at $30,099,593 — up 18.4 percent in quantity and 32.1 percent in value in comparison with November's 332,899 tons valued at $22,791,622, and more than 2½ times as large as the 166,404-ton, $11,506,216, trade of December 1938.

✦ ✦ ✦

SHIPMENTS to Europe (72,657 tons) and to North and Central America and the West Indies (91,579 tons) were smaller than in November, but those to South America (109,455 tons), the Far East (107,767 tons), and Africa (12,577 tons) were higher than in the preceding month.

✦ ✦ ✦

TIN plate was the principal product exported during the month—the total of 57,675 tons including 6,148 sent to Brazil, 5,339 to Argentina, and 4,020 to Canada. The Philippine Islands, the Netherlands Indies, and the Union of South Africa also pur-

chased large quantities of tin plate in December. Second in point of tonnage shipped was nonalloy ingots, with a trade totaling 47,995 tons, of which 27,993 went to Japan and 17,348 to the United Kingdom. The trade in nonalloy black steel sheets—26,432 tons—included 8,255 to Canada, 2,726 to Argentina, and 2,682 to Mexico, while the 26,237-ton trade in nonalloy "other" plates included shipments of 3,615 tons to the Netherlands, 3,373 to Canada, 2,952 to Argentina, and 2,930 to Sweden.

✦ ✦ ✦

INCLUDED in the December 1939 trade was 204,298 tons of iron and steel scrap—of which 124,216 went to Japan, 30,039 to Italy, 19,350 to the United Kingdom, and 12,054 to Canada; 743 tons of tin-plate scrap, 788 tons of tin-plate circles, etc., and 573 tons of waste-waste tin-plate.

OF the 5 major geographical areas to which exports move, only the Far East took less United States steel in 1939 than in 1938—645,660 tons against 866,691. The trade with Europe — largely because of increased shipments to the Netherlands and Sweden—rose from 434,492 to 597,154 tons; that with North and Central America and the West Indies, at 658,982 tons, was greater by nearly one-half than in 1938—450,832 tons; South America bought 503,818 against 318,539 tons; while the trade with Africa climbed to 93,388 tons from the 1938 figure of 78,694 tons.

✦ ✦ ✦

Germany Regulates Utilization Of Metal Waste

THE German Government has issued a decree regulating the use of waste, scrap and residues of the following metals: aluminum, lead, copper, magnesium, nickel, zinc, and tin and alloys of these metals. All such metal waste, scrap, and residues must be currently collected, sorted, stored and properly handled for all enterprises where such materials accumulate. If the material is not used in the respective plant itself then it must be promptly sold in accordance with regulations covering such sale.

✦ ✦ ✦

Something of the What, Why And Where of Unemployment

"WHAT has become of the jobs of the unemployed?" ask Messrs. A. W. Rucker and N. W. Pickering, business economists, in a study just published by Farrel-Birmingham Company, Inc., of Ansonia, Connecticut. They proceed to answer this question.

MICROMETER PRECISION MICRO-WELD TRADE MARK REG. U. S. PAT. OFF.

CONTINUOUS IMPROVEMENT

MICRO-WELDERS with dial indicating annealing attachments are now available for high carbon wire.

There is positive control of annealing temperature and already hundreds of these special MICRO-WELDERS are proving their dependability and satisfactory performance with leading manufacturers.

Model E.-1-S Welder Capacity .010 to .062" high & low carbon wire.

MICRO PRODUCTS COMPANY

20 NORTH WACKER DRIVE, CHICAGO, ILL.

Telephone, State 7468

"THE 1937 Census of Manufactures discloses a decline in the number of going concerns as compared to 1929 totalling 41,848 plants. That shrinkage in the source of employment is alone sufficient to explain the cause of a substantial part of the decline in work opportunity. It is significant that in a period of apparent recovery attended by a series of anti-business political moves and punitive taxation, the expansion in the number of going concerns came to a halt in 1935, so that the active plants in 1937 were no greater than two years before and 20% less than in 1929. The conclusion that the so-called 'reforms' of the New Deal discouraged enterprise and to a large degree caused much of the prevailing unemployment appears well warranted. The conclusion is strengthened by noting that the net worth of manufacturing corporations in 1937 was 23.1% less than in 1929, while the ratio of net earnings to sales declined 25.5%. That suggests that the decline in profit opportunity was matched by a corresponding decline in the number of going concerns and total employment opportunity . . . It is noteworthy that, in general, employment opportunity has shifted from the durable and heavy goods industries to the consumable and light goods industries."

✦ ✦ ✦

A SECOND shift in employment, showing where the jobs have gone, is from the largest and smallest concerns to the medium-sized ones, say Messrs. Rucker and Pickering. They illustrate this shift, as they do the shift mentioned above, with a table. In this connection they state: "The small declines in employment among the concerns doing larger volumes and presumably best able to replace men by machinery, suggest the fallacy of the theory of machine unemployment. It is significant that the greatest percentage decline took place in employment among the size of concerns pre-

(*Please turn to Page 172*)

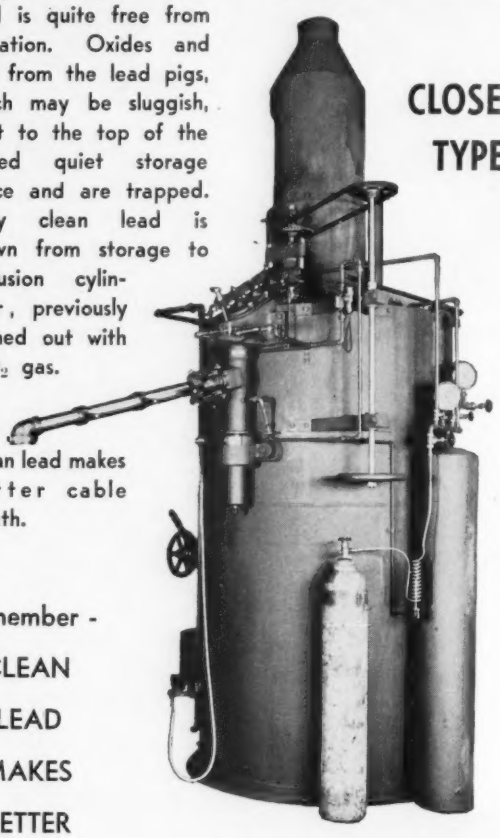
KONIK
MFD. UNDER U. S. PATENT NO. 1874814
CONTINENTAL
MANUFACTURER'S WIRE
Continental is prepared to meet the specifications of manufacturers for many special kinds of low carbon wire shapes and analyses. Besides special-analysis and copper-bearing steel wire Continental — and only Continental — offers wire of Konik, the patented new steel containing copper, nickel and chromium.
Among the finishes offered by Continental are bright, bright and black annealed; sull-coated; processed; galvanized, including Flame-Sealed; liquored, coppered and tinned in many modifications. Eight shapes are standard and many specials available. Regular gauges run from No. 34 to 5/8 inch. Furnished in coils of suitable sizes, or cut and straightened to specification.
CONTINENTAL STEEL CORP.
General Offices: Kokomo, Indiana
Plants at Canton, Kokomo, Indianapolis
CONTINENTAL
STEEL SHEETS AND WIRE PRODUCTS
Wire: Bright Basic, Annealed, *Konik, Special Manufacturers, Galvanized, *Flame-Sealed
Wire Rods, Nails, Staples, Bale Ties, Barbed Wire: Fence — 15 Types; Gates and Fittings
Sheets: Black, Galvanized, Special Coated; Roofing and Siding — 14 Styles
*Trade Mark Registered, U. S. Patent Office

IN the Robertson Closed Lead Melting Pot, CO_2 gas is used to keep down the formation of oxides over the lead in the melting pot and also during the process of filling the extrusion cylinder with lead.

The large valve opening with free flow helps to quickly fill the extrusion cylinder; the valve is entirely outside of the melting pot so that it may be easily cleaned and serviced.

The filling tube serves as a melting chamber and the main body of the pot serves as the storage where the molten lead is quite free from agitation. Oxides and dirt from the lead pigs, which may be sluggish, float to the top of the closed quiet storage space and are trapped. Only clean lead is drawn from storage to extrusion cylinder, previously flushed out with CO_2 gas.

CLOSED TYPE



Clean lead makes better cable sheath.

Remember -

CLEAN

LEAD

MAKES

BETTER

SHEATH

!

ROBERTSON LEAD MELTING POT

JR

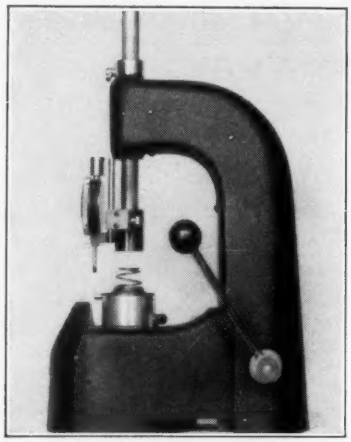
JOHN ROBERTSON COMPANY, INC.
125-137 Water Street
Brooklyn, New York

Investigate! Compare! Complete operating and performance data is yours to examine. A note on your letterhead brings it to your desk. No obligation, of course.

The Link Spring Checker

A RAPID and accurate method of testing compression springs is afforded by the Link Spring Checker, PB3 unit. Other applications for this equipment include tests for load required to operate valves, firing pin assemblies and similar units. The standard model handles springs up to 6″ free height and 2⅝″ diameter, in 10-50-250 lbs. capacity. It is provided with a 6″ vertical height scale graduated to 1/32″ for indication of compressed height. The unit shown has a special 1″ travel reverse-reading dial indicator fitted in an adjustable ram bracket to allow maximum of range of 4″. The dial indicator is adapted to the checking of springs with close height tolerances.

✦ ✦ ✦



FOR 10 lbs. capacity, the load dial is graduated to ½ oz. For 50 lbs. capacity, to 2 oz., and for 250 lb. capacity to 8 oz. Weighing units are interchangeable, adding to the flexibility of the unit and covering a wide range with a minimum of equipment.

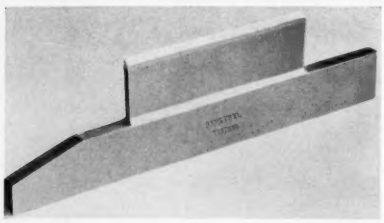
✦ ✦ ✦

FOR larger quantities of springs, the Heightrol is available. It incorporates an electrical contact circuit giving a buzzer signal when the pre-set height stylus makes contact. For small tension springs, a bridge may be fitted to the table. Accurate enough for laboratory use, the device is sufficiently rugged for production inspection.

Centerless Grinder Blades Faced With Tantung Wear Resisting Alloy

CENTERLESS grinder rests for any type of machine or grinding operation, faced with a tough, slow wearing alloy, are obtainable from Fansteel Metallurgical Corporation, North Chicago, Illinois.

✦ ✦ ✦



THE hard facing, Tantung, is a patented Fansteel alloy composed of hard particles of tantalum and tungsten carbide, uniformly distributed and firmly embedded in a strong, tough matrix. Tantung differs from conventional hard facing materials in that the presence of tantalum carbide not only contributes to hardness, but imparts a peculiar lubricating characteristic which improves resistance to wear. The alloy successfully withstands the severe service of centerless grinding operations, outlasting the hardest types of steel blades by a wide margin.

✦ ✦ ✦

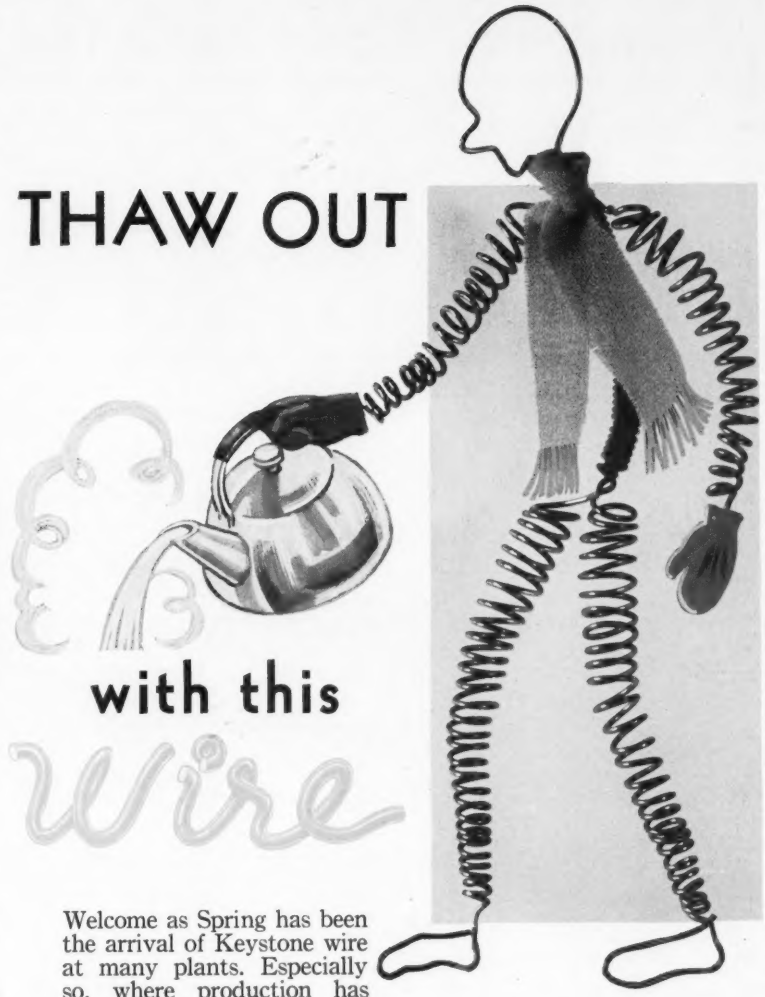
THE Tantung facing, which is made in bar form, is firmly affixed to the steel supports by a special brazing process perfected in the Fansteel plant. Complete blades are manufactured to specification, Tantung facing is applied to existing blades furnished by users, or Tantung bars are obtainable for those equipped to do their own brazing.

✦ ✦ ✦

WORN out blades can be reclaimed by application of Tantung facings, and when the Tantung facing itself finally wears out, a new facing can be applied, thus giving grinder blades indefinite life.

For Information Regarding The Wire Association Address
Richard E. Brown, Secretary
300 Main Street, Stamford, Conn.

THAW OUT



with this wire

Welcome as Spring has been the arrival of Keystone wire at many plants. Especially so, where production has been badly "frozen up."

You'll find this dependable wire has a way of melting down obstacles—starting profits to grow again! That's because Keystone wire comes "hot" from an expert metallurgical and technical staff. They've put the "heat" on many a difficult wire assembly or fabrication problem —and established continuous, smooth-flowing output.

You might like to look over samples of the many regularly-stocked wires this experience has created. Or . . . just bring your "frosty" wire problem and let us help you thaw it out right from the beginning.

KEYSTONE

STEEL & WIRE CO. Dept. W. PEORIA, ILLINOIS

HIGH CARBON or LOW CARBON

Bright . . . Tinned
Coppered
Annealed
Galvanized

SAMSON SPRING WIRE
REG. U.S. PAT. OFF.
KEYSTONE STEEL & WIRE CO. PEORIA, ILL.

'Round the World With the Wire Industry

THE situation on the European wire market is unaltered. No changes of any importance in wire prices are reported. The quotations are as follows: (basis—gold £) wire nails 8.2.6 - 8.10; wire rods 7.2.6 - 7.10; bright wire 7.15 - 8.2.6; galvanized wire 8.17-6 - 9.7.6; barbed wire 10.10 - 11.0; discount off the British standard list for galvanized wire netting 75-77½%. Prices are, of course, not uniform, as IWECO is no longer in existence. To these prices high freight rates and insurance charges must be added for export to Oversea. Belgium has restarted selling wire nails and other wire products to Oversea, but is concentrating more on Africa, the Near East and Asia and less on Latin America, which is rather neglected. The supply of wire rods are insufficient to almost all buyers and Great Britain is at present particularly short of this material, but supplies from Belgium are increasing. The German wire industry continues to sell to Scandinavia, the Baltic and particularly the Balkan and Near Eastern market, although the very severe winter weather this year in the Balkans is hampering the transport thereof. The German export prices, mostly in Reichsmarks, are converted about the same as the actual Pound quotations. Russia is not buying any substantial quantities of wire products, except strand wire and wire ropes, but is a large buyer of wire machinery. It is not known in what amounts Russia has recently bought German wire machinery, but this may well exceed three million Marks and more business is pending now also for large units. The wire machinery trade to other markets is quiet. Japan has bought some multiple spindle wire drawing machines. It is well known, that many Overseas markets are keen to extend their production capacity on wire and wire products, but hesitate to do so, believing the present costs are too high. Of course, the German business with Oversea is very small. There is no shortage of zinc for coating, particularly as the rather large Polish production (about 100,000 tons annually) has been grabbed by the Germans. Tin is short, but if demanded, the German industry sells also tinned wire (for mattresses, etc.) for export. The supply of wire rods, etc., to the wire industry is about normal and no restrictions have been imposed on the use of wires in Germany. The other continental countries, such as Sweden, Holland or Switzerland have made but little effort so far to extend their wire export trade, the domestic markets absorbing

Can You Match These Rod Baking Costs . . ?

. . Which are the average of the latest 10 Morrison Flash Baker installations

From ten recent Morrison Flash Baker installations in the U. S. come these significant facts: (1) Production of 15.7 tons per hour, per unit. (2) Average baking time of five minutes. (3) All done in the cleaning house with a tank-sized unit. (4) Every class of work handled from basic rod to fine wire. (5) Firing by oil and gas; direct and indirect.

These facts speak for themselves. They likewise bring out an invaluable element in Morrison service —broad experience! This combination of successful performance plus a world-wide background of experience is yours when you install Morrison Flash Bakers.

U. S. Patent Nos. 1,999,513 2,156,303

MORRISON ENGINEERING CORP

5005 EUCLID AVENUE CLEVELAND, OHIO

MORRISON ENGINEERED

403

what the industry can supply and the question of raw materials hindering a greater extension. The shipment dates are extended and irregular. The Belgian industry is quoting ten to twelve weeks without guarantee due to irregularity of shipment. It is learned here, that Japan unlike the former war, has no possibility of extending her export trade due to the Chinese situation, but Australia is more and more gaining ground in the Straits and even India.

✦ ✦ ✦

British Iron and Steel Prices Set

A NEW scale of prices for British iron and steel products went into effect on November 1, 1939. According to an official announcement appearing in the Board of Trade Journal for November 9, the new prices take account of the increased costs of the principal imported materials including the higher freight charges now in operation. The effect of the order is to increase the price of billets and heavy steel by £1 per ton with corresponding adjustments in the price of finished products.

✦ ✦ ✦

Reactive Wire Drawing In Practice

(*Continued from Page 159*)

ly drawn wire show, on test, quite a variation from those of wire drawn conventionally. Also, among wires reactively drawn, these properties vary with the amount of reactive load applied. The properties of the wire are contingent upon the condition of the rod or wire when reactive drawing starts and upon the amount of cold work which is performed reactively. In practically all cases, wires reactively drawn have shown, on test, an increase in torsion resistance with varying results in tensile and bend tests; these latter test results depend upon the amount of reactive load applied and the condition of the rod or wire before being drawn.

V—The above results indicate that by properly applying Reactive Drawing to a particular problem, wire may be drawn further before it is necessary to resort to heat treatment, and that the amount, and therefore the cost, of the heat treatment required may, apparently, be reduced.

VI—It appears that a new tool has been made available for the wire drawer, whereby not only may the cost of production be reduced, but the physical properties required in the finished product may be better controlled and specifications more rigidly adhered to.

✦ ✦ ✦

ALL wire was drawn and coiled on a 9″ Diam. Pull Block, using Firthaloy Dies, supplied for these experiments by the Firth-Sterling Steel Co., and Standard No. 99 Wire Draw Soap Compound as a lubricant, supplied for these experiments by the Standard Industrial Compounds Co. All wires showed a fine grain Sorbite structure.

Manufacturers of materials, tools and equipment for wire drawing and forming plants are constantly making improvements and additions to their lines. If you do not find the product or service in which you are interested, additional information will be supplied promptly. Simply address:

WIRE & WIRE PRODUCTS
300 Main St., Stamford, Conn.

BIGGER LOADS *with* LESS REHANDLING

With a Cleveland Tramrail overhead materials handling system more bundles can be handled per load and rehandling greatly reduced.

In many mills, rod is taken from the cleaning house through coating and bakers to wire blocks without removing from the Cleveland Tramrail hairpin hook carriers.

Let Cleveland Tramrail help you reduce costs.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
1141 Depot Street Wickliffe, Ohio

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT
Other products: CLEVELAND CRANES and STEELWELD MACHINERY

A Review of Recent Wire Patents

No. 2,185,416, WIRE-DRAWING MACHINE, Patented January 2, 1940 by Myles Morgan and Weld Morgan, Worcester, Mass., assignors to Morgan Construction Co., Worcester, Mass., a corporation of Mass.

It is claimed that an accurate control of the back tension in the wire is achieved with this machine, which is of the type having rotatable drums to draw the wire through a series of dies successively. Means is provided to apply a predetermined torque to each drum. There are 22 claims.

✦ ✦ ✦

No. 2,185,558, ELECTRICAL CONDUCTOR, Patented January 2, 1940 by Jesse B. Lunsford, Washington, D. C.

About the stranded wire conductor is a synthetic resin filling the interstitial spaces between the strands, this resin being repellant to moisture and storage battery acid, heat resistant to 20°C. above the boiling point of water, and is said to be permanently flexible.

✦ ✦ ✦

No. 2,185,883, STRAND WINDING MACHINE Patented January 2, 1940 by Frederick C. Berger, Brooklyn, N. Y., assignor to Bell Telephone Laboratories, Incorporated, New York, N. Y., a corporation of New York.

This machine winds strand material about wire cores, and includes a hollow ring, strand material stored in the hollow ring, the ring having a hole through which the strand material may be withdrawn, means to rotate the ring and

Complete Descriptions and Drawings of Patents May Be Had for 25 cents. Address, Wire & Wire Products, 300 Main St., Stamford, Conn.

means to maintain tension in the strand as it is being wound on the core, the tension means comprising a fixed plate in the area enclosed by the ring and a second plate resiliently pressed against the fixed plate between which plates the strand is drawn.

✦ ✦ ✦

No. 2,186,106, MEANS FOR WINDING WIRE AND OTHER LONG FLEXIBLE ARTICLES, Patented January 9, 1940 by Edward Spencer Hargreaves, Rainhill, and Waldo John Clements and William Austin Brown, Eccleston Park, Prescot, and Anthony Lawrenson, Eccleston, England, assignors to British Insulated Cables Limited, Prescot, Lancashire, England, a British company.

A second block is provided, in addition to the ordinary block on which the wire is wound, co-axial with the latter and capable of being rotated at a speed which may be different from the latter (and stopped as required).

✦ ✦ ✦

No. 2,186,441, ELECTRIC CABLE, Patented January 9, 1940 by Edward D. Youmans, Clifton, N. J., assignor to The Okonite Company, Passaic, N. J., a corporation of N. J.

This patent covers the method of providing an electric cable as described in U. S. patent 2,186,442 below).

No. 2,186,442, ELECTRIC CABLE, Patented January 9, 1940 by Edward D. Youmans, Clifton, N. J., assignor to The Okonite Company, Passaic, N. J., a corporation of N. J.

Over the wire conductor is a fibrous glass layer, under compression in order to eliminate the voids in the layer, and having a metallic sheath embracing the glass layer.

✦ ✦ ✦

No. 2,186,446, ELECTRIC CABLE, Patented January 9, 1940 by Leslie Giddens Brazier, George Monty Hamilton, and Russell Swale Vincent, London, England, assignors to Callender's Cable and Construction Company, Limited, London, England, a British company.

An object is to provide a cable wherein voids between the wire conductor and the dielectric are reduced without the aid of devices for compensating for changes in volume of the filler material.

✦ ✦ ✦

No. 2,186,793, ELECTRIC CABLE, Patented January 9, 1940, by Hans V. Wodtke, Dobbs Ferry, N. Y., assignor to Anaconda Wire & Cable Company, New York, N. Y., a corporation of Delaware.

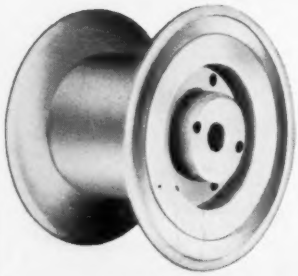
About the rubber covered wires is a sponge rubber filler surrounded by a vulcanized rubber sheath.

✦ ✦ ✦

No. 2,186,820, COIL WINDING MACHINE, Patented January 9, 1940 by Penrose E. Chapman, St. Louis, Mo.

A reversible traverse mechanism is

FINE WIRE HIGH SPEED WIRE DRAWING SPOOLS



James Day (Machinery) Ltd.,
Sentinel House,
Southampton Row,
London, W. C. I, England.

MOSSBERG **PRESSED STEEL** CORP.

Announces a complete line of HEAVY DUTY PRECISION SPOOLS and REELS especially designed for high speed wire drawing and annealing.

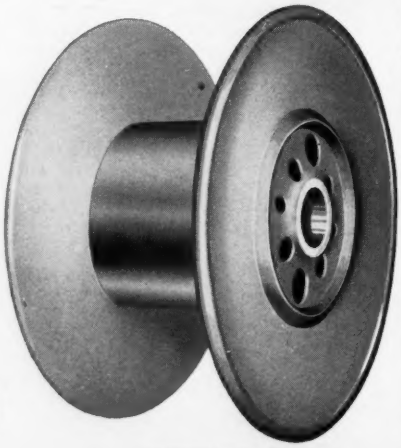
The degree of efficiency obtained by the HIGH SPEED WIRE DRAWING MACHINE is largely dependent upon the accuracy and durability of the take-up spool.

The use of our PRECISION SPOOLS will increase your machine efficiency and eliminate your spool difficulties.

Complete range of sizes.

MOSSBERG PRESSED STEEL CORP

18 West Street,
ATTLEBORO, MASSACHUSETTS, U. S. A.



COMBINATION
500 lb. CAPACITY WIRE DRAWING — ANNEALING — STRANDING — REEL.

provided comprising a double disc and roller assembly, a traverse element for guiding the wire being wound driven by the roller, a transfer element for oscillating the roller from one disc to the other to effect reversal of movement of the traverse element, a shipper actuating the transfer element, stops upon the shipper arranged to be contacted by the traverse element.

✦ ✦ ✦

No. 2,187,129, APPARATUS FOR MAKING WELDED WIRE NETTING, Patented January 16, 1940 by Wilhelm Kramer, Emmerich Rhine, Germany.

This machine is adapted to provide, simultaneously, a number of narrow bands of wire netting with the meshes running in the direction of length.

✦ ✦ ✦

No. 2,187,401, INSULATED ELECTRICAL CONDUCTOR, Patented January 16, 1940 by Frank M. Potter, Rome, N. Y., assignor to General Cable Corporation, New York, N. Y., a corporation of N. J.

The structure includes a self-sustaining jacket of felted-on material, which jacket is seamless and of uniform thickness. The material may be cotton, flax, wool, asbestos and the like.

✦ ✦ ✦

No. 2,187,841, WIRE WINDING APPARATUS, Patented January 23, 1940 by Robert C. Pierce, Niles, Mich., assignor to National Standard Company, Niles, Michigan, a corporation of Michigan. One of the objects of the invention is to provide an apparatus to wind a number of wire strands into a flat band upon a spool, without interfering with the adjacent wires.

✦ ✦ ✦

No. 2,187,873, FLEXIBLE WIRE TUBING, Patented January 23, 1940 by Otto J. Bratz, Adrian, Mich., assignor, by mesne assignments, to American Chain & Cable Company, Inc., a corporation of New York.

A binding of flat wire is swedged upon the wire strands assembly, so as to form a continuous sleeve.

✦ ✦ ✦

No. 2,188,358, WIRE FABRIC MACHINE, Patented January 30, 1940 by William A. Kilmer, deceased, late of DeKalb, Ill., by Angelique Kilmer, administratrix, DeKalb, Ill.

This machine is said to be able to produce hexagonal netting or straight line netting by the substitution of but one of the machine elements for another.

✦ ✦ ✦

No. 2,188,407, MACHINE FOR FORMING SPRINGS, Patented January 30, 1940 by Frank J. Horton, Detroit, Mich., assignor to The Murray Corporation of America, Detroit, Mich., a corporation of Delaware.

Springs formed by this machine are flat and longitudinally arched and have a number of sinuous lateral turns.

✦ ✦ ✦

No. 2,188,470, WIRE DRAWING DIE AND DIE HOLDER, Patented January 30, 1940 by Fred H. G. Brandt, Kansas City, Mo., assignor to Sheffield Steel Corporation, Kansas City, Mo., a corporation of Ohio.

It is said this assembly is constructed to prevent excessive pressures of the lubricant and wherein an adequate cooling effect is accomplished.

No. 2,188,755, METHOD OF PRODUCING MULTICONDUCTOR SIGNALING CABLES, Patented January 30, 1940 by Oscar S. Markuson, Baltimore, Md., assignor to Bell Telephone Laboratories, Incorporated, New York, N. Y., a corporation of N. Y.

Periodically recurring irregularities in the twists of the wires are said to be reduced by this method. The cables are for telephone and allied uses.

✦ ✦ ✦

No. 2,188,869, WIRE FENCE, Patented January 30, 1940 by William H. Sommer, Peoria, Ill., assignor to Keystone Steel & Wire Company, Peoria (South Bartonville), Ill., a corporation of Ill.

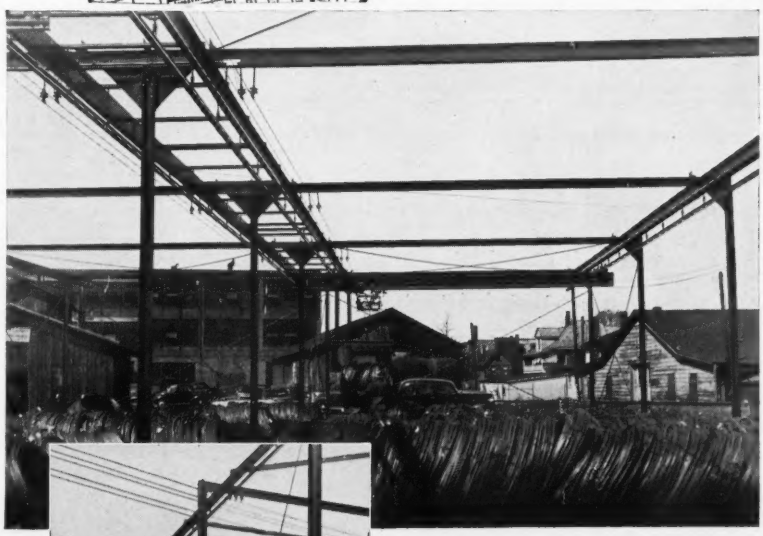
Continuous one-piece stay wires are employed for the upper and lower terminal ends of which are coiled or looped once around the marginal or selvage wires, the latter being provided with crimps for seating the coils or loops.

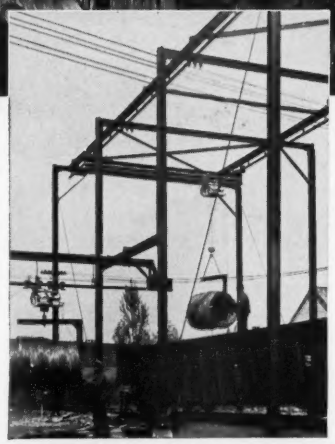
Manufacturers of materials, tools and equipment for wire drawing and forming plants are constantly making improvements and additions to their lines. If you do not find the product or service in which you are interested, additional information will be supplied promptly. Simply address:

WIRE & WIRE PRODUCTS
Stamford Trust Co. Bldg.
300 Main St., Stamford, Conn.

"Saves 32c per ton!"

in handling cost - - -





Unloading and storing coiled rod from box cars formerly cost 40c per ton and required 5500 sq. ft. of warehouse space.

Now, raw coils are unloaded from gondolas, stored outside and handled through pickling to punches and cold-headers at 8c per ton.

A Clear Saving of 32c per Ton Made Possible by Overhead Handling

Innovations, such as a turntable for transferring coils between hoists, develop in conference with American MonoRail engineers.

AMERICAN MONORAIL CO.
13117 ATHENS AVE., CLEVELAND, OHIO

Something of the What, Why and Where of Unemployment

(*Continued from Page 165*)

sumably least able to install improved equipment. It is also significant that with all the political promises so glibly made to aid Little Business, the performance in that group should actually be the worst of the entire number."

✦ ✦ ✦

A THIRD table in the study shows the percentage change in employment opportunity to geographical sections as reported by the Census. "From this table", say the authors, "it is easily seen that available jobs are moving from the East and North toward the South and West. The significance of this fact may lie in the related facts that it is in the East and North that labor troubles, increases in the tax burden and in some states a more advanced type of social legislation have been depressants on enterprise. Any effective attack upon the unemployment evil would probably need to consist of the modification or repeal of uneconomic legislation throughout this region."

✦ ✦ ✦

STILL a fourth shift in job opportunity is shown in another table. This is a shift from the largest and smallest of the great urban industrial areas to either the medium-sized cities or to the smaller cities and towns outside the principal industrial areas. "Here, as elsewhere" the authors assert, "are visible the effects of the decline in the number of going concerns, conditioned if not wholly caused by anti-business political moves, excessive taxation and extreme labor legislation."

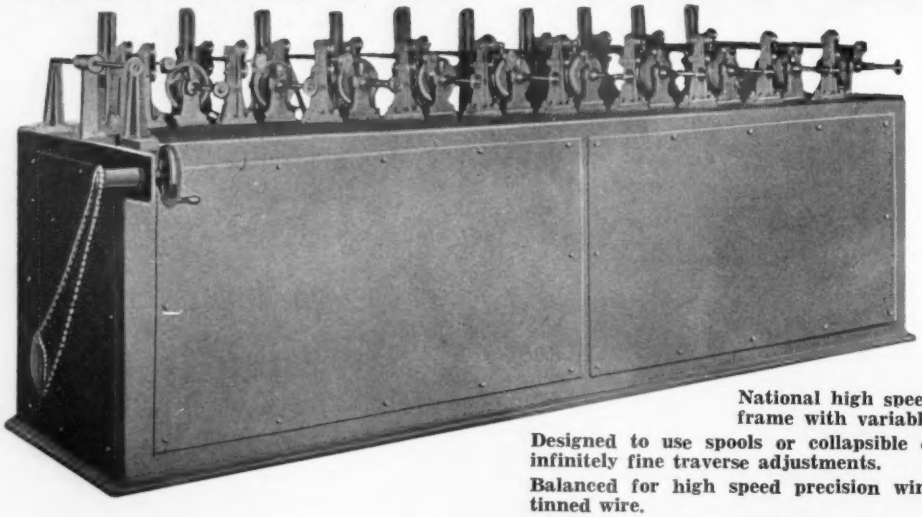
✦ ✦ ✦

"IN a broad sense, much of the basic cause of the unemployment problem can be removed by cessation of efforts to protect an arbitrary wage rate structure and to conceal the effects thereof by enforced spreading of employment through the Federal Wage-Hour Law and the Walsh, Healy and Wagner Labor Acts. If wage rates be allowed to find their economic level, many of the evils now visible will automatically correct themselves. For it is almost, if not quite, certain that the sum-total of manufacturing payrolls in a year cannot be expanded by **fiat**—and that therefore an arbitrary increase in hourly wage rates simply reduces the volume of manhours and the number of persons which can be employed. That, probably, is the key-log in the economic jam — and it can be removed."

✦ ✦ ✦

FINALLY, conclude Messrs. Rucker and Pickering, "If management can induce employees, legislators and public officials to see the relation between profit possibilities and the number of going concerns, between these and the number of jobs, much of the task can be accomplished. It may be enough to remove the chief restrictions and to encourage management to overcome the minor ones."

CONTINUOUS IMPROVEMENTS



National high speed ten head tinning frame with variable speed drive.

Designed to use spools or collapsible coiling heads, with infinitely fine traverse adjustments.

Balanced for high speed precision winding or coiling of tinned wire.

Tinning speeds from 200 feet per minute to 750 per minute.

Many distinctive features fully described in Bulletin W-3.

NATIONAL RUBBER MACHINERY CO.

General Offices: AKRON, OHIO

Banner Division, COLUMBIANA, OHIO
Eastern Division, CLIFTON, N. J.

David Bridge & Company, Ltd., Manchester, England
The Bawden Machine Company, Ltd., Toronto, Canada

Swaging Machines

A CATALOG recently issued by the Standard Machinery Company of Providence, Rhode Island provides very complete descriptions for their "Standard" Rotary Swaging Machines.

✦ ✦ ✦

THESE machines are the result of over 48 years experience in design and manufacture of this type of machinery and engineering recommendations concerning the swaging of any particular work will be furnished upon request.

✦ ✦ ✦

ROTARY Swaging, as a forging process for reducing the diameter of tubular and solid bar stock into cylindrical, conical, or 'necked' and other special shapes has inherent advantages:

1. **The work is formed without any loss of material. On solid stock, the material saving alone equals or nearly equals the actual cost of the swaging process.**
2. **As tubular parts are reduced in diameter, the wall thickness increases. In this way increased strength and sufficient section is obtained for threading or for other machining operations.**
3. **Swaging actually improves the physical characteristics of the metal itself; increasing its tensile strength and elastic limit; making the metal harder and of more uniform grain structure.**
4. **Parts which are swaged have a high finish and can be held to close limits of accuracy if the dies are carefully made. Exact dimensions can be duplicated on an almost unlimited number of parts, regardless of the skill of the operator.**
5. **Unskilled operators can be used as opposed to the skilled mechanics required for other finishing operations such as grinding or turning.**

✦ ✦ ✦

COPIES of this booklet may be obtained either from the Standard Machinery Company, Auburn, Rhode Island, or by addressing Information Service, WIRE & WIRE PRODUCTS.

✦ ✦ ✦

Worcester Regional Meeting

THE 1940 Worcester Regional Meeting will be held at Worcester, Mass., Thursday, April 11, 1940.

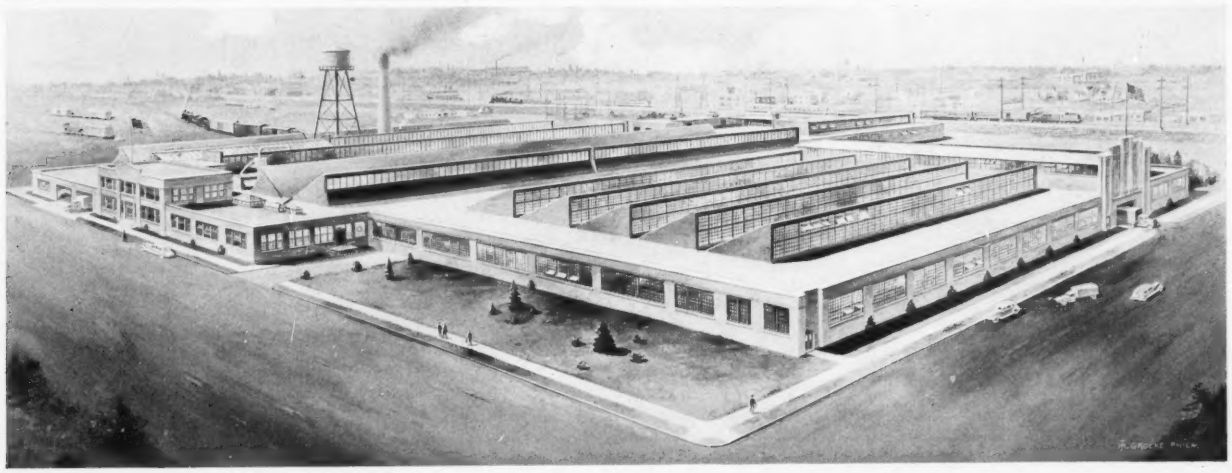
A PLANT visit will be held in the afternoon and in the evening a dinner will be held at Putnam & Thurston's at 6:30. The dinner will be followed by a talk on the subject of "Tungsten Carbide". An entertainment will top off the evening.

✦ ✦ ✦

THE committee in charge consists of R. R. Tatnall, Wickwire Spencer Steel Company, Chairman; Eugene Roth of the Carboloy Company, S. Ekstrom of the New England High Carbon Wire Company and Earl H. Thomas of George W. Prentiss & Company.

✦ ✦ ✦

AN invitation is extended to all wire mill men to attend this meeting as well as representatives of the companies which do business with them. There will be no registration fee or charge of any kind and each man will pay for his own dinner.



SYNCRO MACHINE COMPANY — RAHWAY, NEW JERSEY

Manufacturers of equipment for the electrical wire and cable industry. May we quote on your next requirements?

SYNCRO

SYNCRO MACHINE COMPANY

420 Lexington Avenue, New York — McCormick Bldg., Chicago

Represented in Canada by — Canadian Elevator Equipment Co., Ltd., Toronto

New Type Nickel Fish Hooks

(Continued from Page 160)

IN view of the present war there has been some apprehension among fishermen that these sources of supply may be cut off.

✦ ✦ ✦

THE new "Z" nickel fish hooks—a product of Bill DeWitt Baits, Division of Shoe Form Company, Auburn—are made by a combination of automatic and manual operations. At present they are produced in five O'Shaughnessy style sizes for a range of fish from the small mouthed flounder to the Tuna.

✦ ✦ ✦

Shiftweight "Jr." Wire Reel

ABOUT three months ago, Moslo Machinery offered to the trade a new type wire reel called "Shiftweight". This reel met such instant acceptance in the industry that Shiftweight "Junior" was brought into being.

IDENTICAL in every respect to its bigger brother, the new reel is designed for 175 pound wire coils. Embodying every feature that has made the "Shiftweight" such a popular wire handler, this new little tough guy of the wire handling gang is an out and out one man reel. It is of welded steel construction throughout — uses a shifting counter-balance, based on fluid principles, to do the lifting work after an operator has placed a wire coil in position. A locking latch, for holding the tilted reel in position for loading, operates through center spindles. The loader has both hands free and is never thrown off balance when positioning a coil.

✦ ✦ ✦

FULL upper guard rings insure perfect feed from coil. Adjustable friction brake controls tension of feed. Designed to be absolutely snarl proof. Balanced to eliminate bolting to floor. Sturdy construction insures long wear.

THIS reel offers some unusually attractive features wherever coiled wire handling is a problem.

✦ ✦ ✦

Walter Larkin

WALTER LARKIN, senior inventor of the Fidelity Machine Company, Philadelphia, Pa., will receive Modern Pioneer Award at one of the most important banquets of the year at the Bellevue-Stratford on February 16th as the result of the joint sponsorship of the National Association of Manufacturers and the Philadelphia Chamber of Commerce.

✦ ✦ ✦

THE banquet is to be held in conjunction with the nation wide observance of the 150th anniversary of the United States Patent System.

✦ ✦ ✦

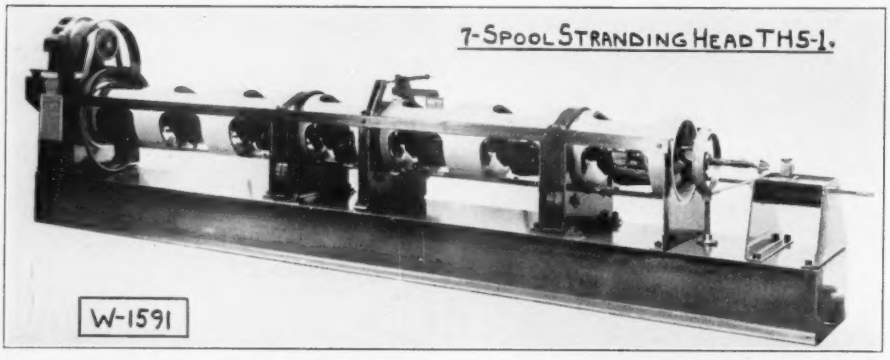
AMONG the inventions for which Mr. Larkin is receiving recognition are improvement and perfection of wire and cable covering by means of knitting process.

THE WATSON MACHINE COMPANY

ESTABLISHED 1845

PATERSON, NEW JERSEY, U. S. A.

TUBULAR STRANDING MACHINES
Standard Sizes For From 5 to 1000 Pound Spools
Silent Support Rolls—All Steel Rotor—Vee Belt Drive—Electric Stops
7 Second Brakes



ELECTRICAL WIRE, CABLE & WIRE ROPE MACHINERY
Printed Literature Available On Considerable Of The Equipment Used In These Fields—Inquiries Are Invited

Standard Improves Weather Resistance of Coverings for Aerial Wire and Cable

(*Continued from Page 158*)

THESE considerations resulted in an undertaking by the representatives of the wire and cable manufacturing group to develop a specification for fibrous coverings, and materials suitable for their treatment, primarily intended to give the optimum in protection against the weather.

✦ ✦ ✦

THE membership of ASA Technical Committee No. 8 included several representatives who were particularly interested in this subject of protecting aerial rubber-insulated wire and cable, and by considerable discussion and comparison of experience over several years, it was finally possible for this committee to complete the new American Standard Specifications for Weather-Resistant Saturants and Finishes for Aerial Rubber-Insulated Wire and Cable (C8.19-1939).

✦ ✦ ✦

ACKNOWLEDGMENT is made of the helpful assistance given by the communication and power utilities, the manufacturers of saturating and finishing compounds, and the wire and cable companies through their personnel and use of their development and laboratory facilities.

✦ ✦ ✦

PHYSICAL characteristics of the saturant are given in the specification but characteristics of the finisher are not included. The reason is that the finishing compound is subjected to the performance requirements of the finished wire or cable as measured by the melt, drip, and bend tests.

✦ ✦ ✦

FIBROUS coverings for aerial wire and cable have been under consideration in the Technical Committee and in the industry for more than five years, during which time thorough discussion and correlation with available data and experience is believed to have resulted in an adequate and practical standard.

REACTIVE WIRE DRAWING!

Machines for your Experimental and Research Depts.

(*Manufactured and sold under Smith-Stringfellow Patents*)

INCREASE YOUR WIRE DRAWING SPEEDS. AND DIE LIFE. IMPROVE YOUR PRODUCT.

ADDRESS —

REACTIVE WIRE DRAWING

Room #36, Central Exchange Bldg., Worcester, Mass.

Standard Swagers

Available in a complete range of sizes for handling solid stock from ⅛" to 3¾" diameter!

Widely used for every need from pointing wire ends to swaging connections to cable, conduit and hose.

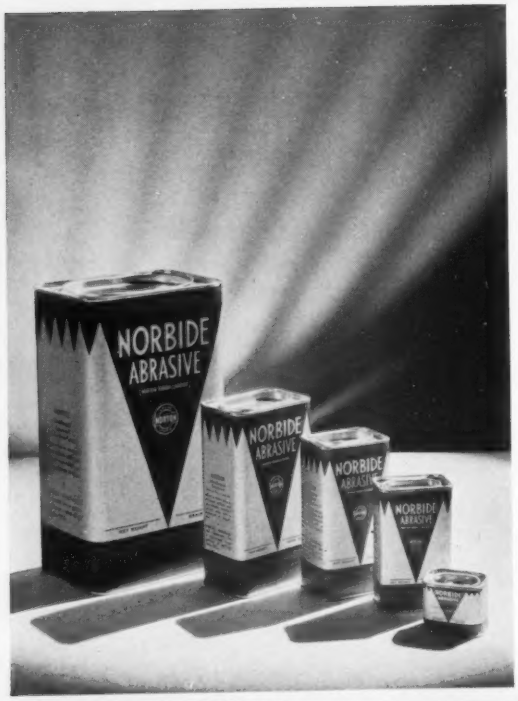
What is your swaging job?

Write for 20 page Catalog SM.

IT'S STANDARD PRACTICE

MACHINERY COMPANY

PROVIDENCE, RHODE ISLAND



NORBIDE
ABRASIVE

For
Cemented
Carbide
Dies

Used in place of diamond dust it reduces the cost of shaping, ripping and finishing.

NORTON COMPANY
WORCESTER, MASS.

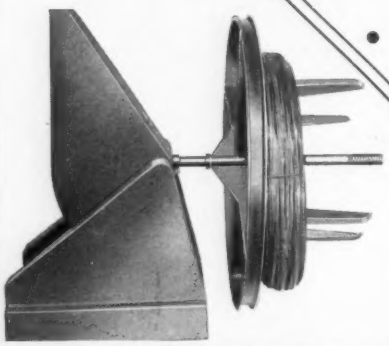
N—38

NORTON ABRASIVES

ANNOUNCING
Shiftweight "Jr."
Tilting Wire Reel

175
POUND
CAPACITY

WITH ALL THE FEATURES OF ITS ALREADY FAMOUS "BIG BROTHER"



- ONE MAN OPERATION
- WELDED STEEL CONSTRUCTION
- SPINDLE LOCKING LATCH
- FULL GUARD RINGS
- SNARL PROOF
- "THE SHIFTING WEIGHT" DOES THE WORK

$85.00 F.O.B. CLEVELAND

COMPLETE WITH SHIFTING BALLAST

MOSLO MACHINERY, Inc.
5005 EUCLID AVE.
CLEVELAND OHIO

Lubricant Research Develops Better Drawing

THE Standard Industrial Compounds Company, Chicago, Illinois, has in recent years carried on considerable research work in connection with new types of lubricants to meet the exacting demands for better finished wire and to facilitate production on subsequent operations of wire products.

✦ ✦ ✦

THESE lubricants bear the Trade Name **"Standard Wire Draw"** and are especially adapted for drawing both low and high carbon wire on high speed continuous machines and produce excellent finish and low die and lubricating costs.

✦ ✦ ✦

THE products of this company also include bright and wet wire drawing compounds and have been adopted by a considerable number of the major wire producers, as well as many of the smaller mills. Patents have been applied for covering these materials.

✦ ✦ ✦

EXPERIENCED service men are provided to demonstrate the merits of their products without cost or obligation. They welcome inquiries regarding wire drawing problems.

✦ ✦ ✦

Bethlehem Steel Adding Large Warehouse At Johnstown Wire Mill

CONSTRUCTION work has started on a large warehouse at the wire mill of the Cambria plant of the Bethlehem Steel Company here, according to an announcement by **Ralph E. Hough**, general manager.

✦ ✦ ✦

THE building, which will provide 55,000 square feet of storage space, will be 250 feet long at one point and is scheduled to be completed by March 1st. Plans also provide for installation of loading docks and tracks and small cranes for moving materials and equipment.

Electric Heat Helps Lubricate Chains Before Shipment

AN unusual application of electric heat was recently made by the Diamond Chain & Mfg. Co., of Indianapolis, Ind. To assure perfect lubrication of chains before packing for shipment this company immersed them in a preloader containing a tank of electrically heated oil. The tank is constructed of ¼-inch sheet-steel with three inches of magnesia on the bottom and sides. Heat is provided by 66 General Electric strip heaters, having a total rating of 39 kw, clamped to the bottom and walls of the tank in six sections.

✦ ✦ ✦

AS the chains leave the lubrication tank, the excess oil is removed by a blast of compressed heated air. The air is heated electrically in a small cylindrical tank before it is compressed. This tank contains two 500-watt immersion heaters. A three-heat switch and automatic thermostat eliminates the necessity of manual temperature control.

✦ ✦ ✦

1939 Book of A.S.T.M. Standards Issued in Three Parts; 866 Specifications and Tests Covering 3700 Pages

PUBLICATION work on the 1939 Book of A.S.T.M. Standards has recently been completed and copies of this important publication are now available.

✦ ✦ ✦

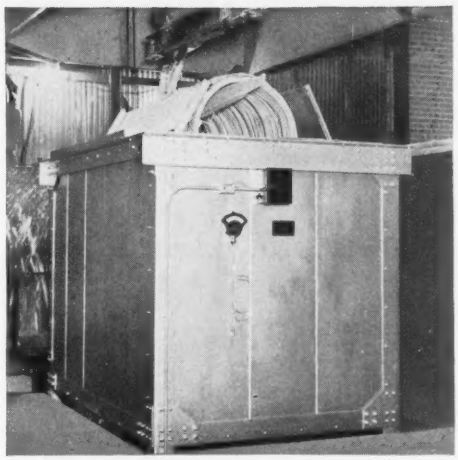
IMPORTANT changes are incorporated in this latest A.S.T.M. publication. For the first time, it contains **all** of the Society's specifications, whether standard or tentative. Formerly the tentative specifications were issued in an annual volume, but the convenience of having these and the formally adopted standards in one volume led to the present combination. The Book is in three parts, instead of two parts as formerly, Part I covering Metals; Part II, Nonmetallic Materials — Constructional; Part III, Nonmetallic Materials—General—the divisions being as follows:

Part I. Metals—Ferrous and nonferrous metals, except methods of

(*Please turn to Page 178*)

CARL-MAYER HI-SPEED TRADE MARK ROD BAKER

Far Ahead in comparative tests!



Large savings per pin in baking time.

Produces work of highest calibre.

Heavy Duty Construction.

Carl-Mayer Hi-Speed Rod Bakers have a more efficient heating and ventilating system . . . The patented Blow-Off feature removes moisture without rolling, bumping or agitating the coils . . . Write for complete details.

Illustration shows a Carl-Mayer Hi-Speed Rod Baker in a large Canadian steel plant.

OVER 20 YEARS EXPERIENCE

The CARL-MAYER Corp.
3030 Euclid Ave., CLEVELAND, OHIO.

BELL-MINE ROTARY KILN PULVERIZED LIME

MANUFACTURED BY THE WARNER COMPANY (BELLEFONTE DIVISION) AT BELLEFONTE, PA. SALES OFFICES AT PITTSBURGH, NEW YORK CITY, PHILADELPHIA AND WILMINGTON

WARNER COMPANY Lime Bell Mine Products BELLEFONTE DIVISION

for wire drawing

"STANDARD WIRE DRAW"
FOR HIGH-LOW CARBON, BRIGHT, COLD HEADING
WET WIRE DRAWING

- Lower die costs
- Better finished wire
- Lubricants specially adapted for drawing on high speed machines

EXPERIENCED SERVICE MEN WILL DEMONSTRATE
THE MERIT OF OUR PRODUCTS

STANDARD INDUSTRIAL COMPOUNDS CO.
4600 Ferdinand St. Chicago, Ill.

A New, Complete Photo Electric (Electric Eye) and Capacity Relay Experimental Set

REHTRON CORPORATION, manufacturers of photo cells and commercial photo electric equipment have adopted the novel method of developing and enlarging the market for their line by announcing a new, completely assembled photo electric and capacity relay experimental set at the very low price of only $17.50 net.

✦ ✦ ✦

THE set is not a toy or novelty but a simplified, multi-purpose apparatus consisting of a photo electric Robot Relay; a long range Light Source with invisible beam infra red filter; and a Signal-Switch Board equipped for both audible and visible signal demonstrations. A comprehensive, 24 page Instruction Book with diagrams and written in non-technical style so that anyone can understand, describes many practical applications and industrial experiments.

✦ ✦ ✦

WITH the set, which comes all assembled and ready to plug into any 115 volt, 50-60 cycle outlet, nearly all commercial applications of photo electric equipment can be demonstrated or duplicated. The Robot Relay and Light Source may also be used for many permanent practical installations. No batteries are required.

MAKING available such apparatus at its low price may truly be regarded as a form of "constructive sampling", or Sales Promotion and should result in considerable interest on the part of manufacturers who are on the alert to cut costs, improve methods and processes of manufacture, and perhaps add integral or supplementary features to products manufactured and sold. Complete description and specifications may be had by addressing **Rehtron Corporation,** 2159 Magnolia Avenue, Chicago, Ill.

STEEL WIRE
By MAURICE BONZEL

✦ ✦ ✦

Translated and Published by
Kenneth B. Lewis
Consulting Engineer

✦ ✦ ✦

Price $15.00

✦ ✦ ✦

495 pages. 414 illustrations

✦ ✦ ✦

SEND ORDERS TO

WIRE and WIRE PRODUCTS
300 Main St. Stamford, Conn.

1939 Book of ASTM Standards

(*Continued from Page 177*)

chemical analysis. General testing methods.

Part II. Nonmetallic Materials—Constructional — Cementitious materials, concrete, masonry building units, ceramics, pipe, timber and preservatives, paints, road materials, waterproofing materials, soils, general testing methods.

Part III. Nonmetallic Materials — General — Fuels, petroleum products, electrical insulating materials, rubber, textiles, soaps and detergents, paper, plastics, water, general testing methods, thermometers.

✦ ✦ ✦

EACH Part contains a complete subject index and there are three tables of contents, designed to make the Book of maximum utility. The first lists items under the general materials covered; following this is a table of contents giving a complete list of all of the items in the Part by numeric sequence. The third table covers by subject the tentative standards, which appear in the back portion of each Part. These tentative specifications are proposed standards in widespread use throughout industry.

✦ ✦ ✦

PRACTICALLY all of the specifications and tests have been reset in the new double-column format. This use of new type gave all of the Society's committees an opportunity to review the some 866 items included and incorporate a number of editorial improvements. This work has been going on for months in cooperation with the A.S.T.M. Staff.

✦ ✦ ✦

ANOTHER departure in the mechanical features of the Books involves a newly designed backstrap to give the Books a distinctive appearance.

✦ ✦ ✦

THE Society continues the publication of its volume on Chemical Analysis of Metals including 19 methods covering 250 pages. This book is of interest to special groups and the material has not been included in the Book of Standards.

✦ ✦ ✦

Supplements

THE method of issuing the 1939 Book of Standards also provides that a Supplement to **each** of the three Parts will be issued in 1940 and 1941. These volumes

More Tonnage per Pound!

You can get a much higher tonnage of steel wire per pound of lubricant, insure longer die life and maintain better finish, with

MAGNUS WIRE DRAWING COMPOUNDS

Specially formulated to meet the definite conditions of wire size, type of drawing operations and other factors you face in your mill. There's a Magnus lubricant to suit your problems exactly on both wet and dry drawing operations.

GET THIS PERFORMANCE DATA

Ask for your set of reports covering performance of Magnus Wire Drawing Lubricants on all kinds and types of wire.

MAGNUS CHEMICAL CO.
188 South Ave., Garwood, N. J.
Magnus CLEANERS

STEEL REELS AND DRUMS
for
WIRE AND CABLE INDUSTRY
R.B. HAYWARD CO.
1714 Sheffield Ave. Chicago, Ill.

(estimated pages 350 to 500 each) will contain all new and revised standards and tentative standards, and revisions, approved in the respective years.

Sales Prices—Including Supplements

(Cloth Binding)	Any One Part	Any Two Parts	All Three Parts
1939 Book of Standards and Tentative Standards, Parts I, II, III:			
List Prices ..	**$8.00**	**15.00**	**22.00**
Supplements for 1940 and 1941:			
List prices	**3.00**	**5.00**	**7.00**
(Each Year)			

For half-leather binding add $1.00 for each Part and each Supplement.

✦ ✦ ✦

THERE are 866 separate standard and tentative specifications, methods of test, definitions, etc., in the three Parts, with 28 duplications (primarily between Parts II and III). The number of items in each Part is as follows: Part I, 298; Part II, 351; Part III, 245 (total 894).

✦ ✦ ✦

Part I—Metals

THIS Part, 1335 pages, provides in their latest approved form 298 specifications, tests, and definitions covering ferrous and nonferrous metals. Some 178 of the items pertain to ferrous metals, 105 to non-ferrous, and 15 are general testing methods applying to both.

✦ ✦ ✦

Part II—Nonmetallic Materials—Constructional

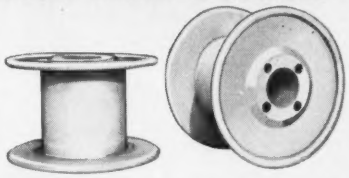
THERE are 351 standards and tentative standards in Part II (1250 pages) covering widely used nonmetallic materials of interest in construction or relating directly thereto.

✦ ✦ ✦

Part III—Nonmetallic Materials—General

WHILE the title of Part III of the Book of Standards is not particularly descriptive, this Part embodies standards in many fields where the Society's work has been of importance such as petroleum products, textiles, rubber, electrical insulation, coal and coke, etc. This Part, covering some 1203 pages, provides in their latest approved form 245 specifications, tests and definitions.

APCO MOSSBERG
STEEL REELS & SPOOLS



For The Copper, Steel, & Wire Rope Industry

Apco Mossberg Steel Reels are standard equipment in the wire industry—and for good reason! Apco Mossberg—the original Frank Mossberg Co.—**originated** the steel reel idea and have been training workmen in their manufacture ever since. Personal attention by Apco Mossberg engineers make each job a "special".

FREE ENGINEERING SERVICE
We will gladly submit drawings, blueprints, or suggestions without obligation to you. Write for quotation today.

APCO MOSSBERG CO.
(The Original Frank Mossberg Co.)
21 Lamb Street, Attleboro, Mass.

WILLEY'S
SIZING, EXTRUSION
WIRE DRAWING DIES

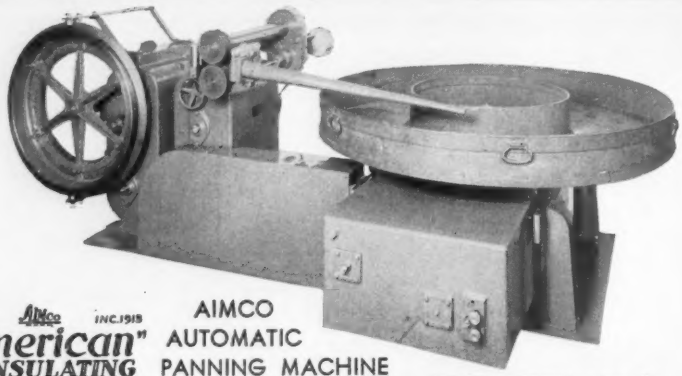
A TUNGSTEN Carbide Metal that will produce a super fine finish with intensive resistance to abrasion.

Your assurance for accuracy and long life production at high speeds.

Sales engineers in principal cities.

Write for Catalogue showing latest price reduction.

WILLEY'S
CARBIDE TOOL CO.
MANUFACTURERS AND SPECIALISTS IN
TUNGSTEN CARBIDE TOOLS
1340 W. VERNOR HIGHWAY • DETROIT, MICHIGAN



EST. 1865 AIMCO INC. 1915
"American" INSULATING MACHINERY COMPANY
REG. U.S. PAT. OFF.

AIMCO AUTOMATIC PANNING MACHINE
For Rubber Covered Wire Ball Bearing

517 West Huntingdon St.
PHILADELPHIA PENNSYLVANIA U.S.A.

WIRE NAIL MACHINERY

These machines are made in eleven different sizes. This enables us to cover any size of nail most efficiently.

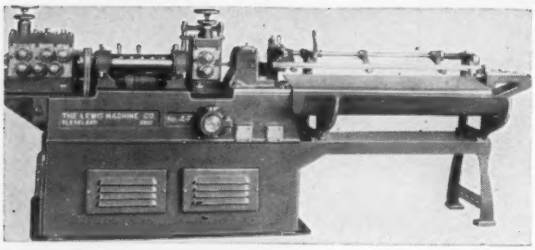
GLADER Nail making machines have been adopted as standard equipment in all recent major nail mill installations.

For further information, prices, etc., write to us.

Wm. Glader Machine Works

210 N. RACINE AVENUE, CHICAGO, ILL.

LEWIS TRAVEL-CUT WIRE STRAIGHTENING and CUTTING Machines



Machines for 1/16" to 3/4" rod
Round
Square
Flat
Hexagon
Ferrous and Non-Ferrous

Automatic
High Speed
Heavy Duty

The Sign of Dependable Service:
WE CAN SUPPLY AND ENGINEER OUR TOOLS EQUIPPED WITH CARBOLOY CEMENTED CARBIDE

THE LEWIS MACHINE CO., 3445 E. 76 St., Cleveland, Ohio

Try **WAYNE Wire Dies**

Wire Drawing Diamond Dies

Wire dies by Wayne embody all the essentials necessary (quality stones — experienced workmanship — the most rigid of inspection) to assure accuracy plus long-life at high speed. Try Wayne dies today—see for yourself why drawers of wire acclaim *"Wayne the best die value obtainable."*

WRITE TODAY FOR OUR PRICES

Wayne Wire Die Co., Inc. 133 MOUNTAIN ROAD, JERSEY CITY, N. J. TELEPHONE JOURNAL 4-4311

60-Cycle AC Current from A DC Motor

MANUFACTURERS located in DC powered areas face a perplexing problem when they require machine shop equipment that demands alternating current. The **Kato Engineering Company,** Mankato, Minnesota, have designed a line of direct current motors, which in addition to driving a piece of equipment also furnish 60 cycle AC current for the operation of an auxiliary function. For instance, spot welding transformers require alternating current. Where spot welding transformers are used in direct current areas, it is necessary to secure an alternating current supply. These special direct current motors will solve this problem efficiently and at low cost.

✦ ✦ ✦

WHEN the machine is supplied to customers who are in direct current areas, it is equipped with a Katolight DC main drive motor which also provides the alternating current necessary for the operation of the butt welder.

✦ ✦ ✦

Simplified Practice Recommendation, Wire Diameters for Mineral Aggregate Production Screens

THE Division of Simplified Practice of the National Bureau of Standards has announced that Simplified Practice Recommendation R147-33, Wire Diameters for Mineral Aggregate Production Screens, has again been reaffirmed without change by the Standing Committee of the industry.

✦ ✦ ✦

THIS recommendation, which covers diameters of wire for production screens for mineral aggregates, became effective February 1, 1933, and was reaffirmed in 1936. These diameters, classified as light, standard light, standard heavy, and heavy, are for 21 specific clear screen openings ranging from 1/8 inch to 3 inches, inclusive.

✦ ✦ ✦

COPIES of R147-33 may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., for 5 cents each.

Outstanding Personalities of the Wire Industry

(*Continued from Page 162*)

John H. Rasp and J. H. Chivers Join Firth-Sterling Staff

FIRTH-STERLING STEEL COMPANY announces two additions to its operating personnel. **John H. Rasp**, who has had wide experience in the manufacture of specialty tools and dies, has been appointed superintendent of the tool and die department of the company's sintered carbide division.

✦ ✦ ✦

J. H. CHIVERS has been appointed superintendent of melting to fill the vacancy created by the death of the late L. B. Knox. Mr. Chivers has served several of the leading tool steel companies in a metallurgical capacity, and just prior to his employment at Firth-Sterling was acting as a consultant on melting practice to a number of steel companies.

✦ ✦ ✦

Norton Co. Announces Changes

NORTON COMPANY of Worcester, Massachusetts, announces changes effective March 1 in their sales organization for the Pacific Coast.

✦ ✦ ✦

P. S. WISWELL, who has been looking after the interests of both Norton Company and their Behr-Manning Division, will devote all of his time to the sale of Behr-Manning products.

✦ ✦ ✦

WARREN H. TURNER, who has been Field Engineer for Norton Company in the Detroit area, will take over the southern California territory, including the states of Arizona and New Mexico, with headquarters in Los Angeles.

✦ ✦ ✦

E. G. PETHERICK, formerly grinding wheel specialist for C. W. Marwedel, Norton distributor in San Francisco, will join the Norton organization with headquarters in San Francisco and take over the northern California district, including also the states of Nevada and Utah.

✦ ✦ ✦

A. M. PITTS, with headquarters in Seattle, will continue as the

(*Please turn to Page 183*)

Learn about **PARALAN**

Paralan will give your finished wire and wire products protection from atmospheric corrosion in the mill and in shipping. Paralan-coated wire can be spot welded or soldered without cleaning. Also, Paralan leaves surfaces in good condition for all types of finishes—enameling, japanning, lacquering, plating, etc.

Write for further information. We may be able to solve your difficulties.

AMERICAN LANOLIN CORP.
LAWRENCE, MASSACHUSETTS

INVENTIONS — PATENTS

Interesting booklet, **General Information Concerning Inventions and Patents** and **Schedule of Government and Attorneys' Fees,** sent free on request. Simply ask for "booklet" and "fee schedule".

Lancaster, Allwine & Rommel
Registered Patent Attorneys
438 Bowen Bldg. Washington, D. C.

STEELSKIN
REG. U. S. PAT. OFFICE
For High or Low Carbon Wire
WIRE DRAWING SOAPS
Established 30 years
R. H. MILLER CO., Inc. Homer, N. Y.

Manufacturers of materials, tools and equipment for wire drawing and forming plants are constantly making improvements and additions to their lines. If you do not find the product or service in which you are interested, additional information will be supplied promptly. Simply address:

WIRE & WIRE PRODUCTS
Stamford Trust Co. Bldg.,
300 Main St. Stamford, Conn.

WIRE WISDOM

Just a little RODINE in the pickling bath saves acid and metal, minimizes brittleness, lowers pickling costs. RODINE more than pays its way.

CUPRODINE creates a denser, tighter, brighter and more uniform copper coating, in less time. Provides better lubrication for drawing than ordinary coating.

Write for details.

American Chemical Paint Co.

Box 306, AMBLER, PENNA.

Detroit, Mich. Walkerville, Ont.

GET COMPLETE LUBRICATION WITH NOPCO 2261

Nopco 2261 is a new departure in tube drawing compounds. Its extremely high neutral fat content—50%, insures correct and adequate lubrication, even in cases where heavy draws with large reductions are made.

Nopco 2261 is highly versatile, being equally effective in the wet drawing of:

Any size copper or brass tubes.
Large copper or brass shells, rivets, etc.
Heavy copper or brass wire.

Nopco 2261 is a superior lubricant. It is formulated of high titre vegetable fats—is readily soluble. It may be depended on to aid production and to effect economies in your drawing operations.

Write for Technical Data Bulletin, or better still, order enough for a trial—see for yourself.

REG. U. S. NOPCO PAT. OFF.

NATIONAL OIL PRODUCTS CO.

HARRISON, N. J.

BOSTON • CEDARTOWN GA. • CHICAGO • SAN FRANCISCO

New Heater Catalog Issued By Westinghouse

NEW and improved electric heating units and controls, designed to meet specific industrial applications for heating liquids, solids, and air, are announced in a new 38 page illustrated catalog issued by Westinghouse Electric & Manufacturing Company, Mansfield, Ohio.

✦ ✦ ✦

STRIP heaters for use in ovens, crane cabs, valve houses, pipe lines, process machinery and hot tables; cartridge heaters for embossing machines, shoe machinery, cigarette machinery, compounding pots and platen heating; corox immersion heaters for oil tempering baths, coffee urns, steam tables, sterilizers and humidifiers; and air heaters for crane cabs, truck houses, valve houses, locomotive cabs, scale rooms and garages, are featured in successive sections of the catalog, pages 4 to 17.

✦ ✦ ✦

PAGES 18 to 29 give details and illustrations of automatic electric glue pots; electric melting pots; single and three heat snap switches; thermostats for temperature control of metals, fluids, and air; switches and contactors with recommended wiring diagrams; and special heating elements for ironing machines, radiant type ink dryers, hat blocking machines, and vulcanizing units. The last nine pages cover general application data and photographs of actual installations.

✦ ✦ ✦

EACH section contains information on the application of the units to particular industrial heating problems, and tables are listed throughout the catalog to assist in the proper selection of units to meet individual requirements.

✦ ✦ ✦

COPIES of catalog 28-000 may be secured from department 8-N-48, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

BALLOFFET Diamond Dies

Skill and accuracy in manufacture with the use of selected stones make Balloffet Diamond Dies the choice of the most critical users.

•

Quality Diamond Dies Since 1870

BALLOFFET DIES AND NOZZLE CO., INC.

45-47 Adams Street

Guttenberg, New Jersey

CONTACT

✦ ✦ ✦

HAVE you a patent, a process or even a workable idea of value to the Wire Industry?

✦ ✦ ✦

THROUGH the services of a well-known wire and spring trades engineer, developments of definite value may be advantageously placed before interested prospects.

✦ ✦ ✦

REPRESENTATION on a straight fee or royalty percentage basis.

✦ ✦ ✦

ALL dealings will be held in strictest confidence.

✦ ✦ ✦

BOX 112

WIRE & WIRE PRODUCTS

Stamford Trust Bldg.

STAMFORD, CONN.

Hy-Carbo Steel Co.
Est. 1917
✦ ✦ ✦
HIGH GRADE CUSTOM WIRE DRAWING
Less Ton Lots A Specialty
✦ ✦ ✦
LOWELL, MASS.

Continuous Straightening and Cutting Machinery
With
FLYING SHEAR
for round and shaped wire.
✦ ✦ ✦
THE HALLDEN MACHINE COMPANY
THOMASTON CONNECTICUT

Largest Stocks in U. S. A.
VIANNEY
Famous Wire Drawing Diamond Dies
250 E. 43rd St., New York

Situation Wanted
Engineer with eighteen years in industrial field, including fifteen in Wire Rope industry, desires new connection. Experience covers plant engineering, ten years plant management, sales and sales engineering. Full details on request.
Box 312 c/o
WIRE & WIRE PRODUCTS

Wiring the Eiffel Tower

(*Continued from Page 148*)

had been brought to ground center between the four bases of the Tower by running the cable over rollers.

✦ ✦ ✦

2. LENGTHS 3-5 and 6 were placed in their position by means of a second winch (4 tons) installed on a special plank construction in the south support at the first platform.

✦ ✦ ✦

SPECIAL precautions were taken that all operations could be under constant control and prepared for any emergency. The Tower was equipped with a specially installed telephone system, consisting of a switchboard and seven telephone sets located at various important key points along the route the cable was to take. An alarm line was also installed along the same route and equipped with a push-button every twenty-five feet, which permitted a signal being sounded in case of necessity and the instantaneous suspension of operations.

✦ ✦ ✦

THE hoisting of the various cable lengths began on Wednesday, May 19, 1937, at 4 A. M. and working from day break until the night forced a stop it took eight days to complete the task.

✦ ✦ ✦

Outstanding Personalities of The Wire Industry

(*Continued from Page 181*)

Norton representative in Washington, Oregon, Idaho, Montana and western Wyoming.

✦ ✦ ✦

John S. Isdale

JOHN S. ISDALE, 144 Curtis St., Meriden, Connecticut, is now representing the Ajax Electric Company, Inc., for the state of Connecticut.

Everything for the Wire and Cable Industry.
Let us estimate on your needs!
NEW ENGLAND BUTT CO.
PROVIDENCE, R. I.

GEORGE D. HARTLEY
CONSULTANT
ON
SPRING MAKING
AND
WIRE WORKING
MACHINES & METHODS
311 MAIN ST.
WORCESTER, MASS.

KENNETH B. LEWIS
CONSULTING ENGINEER
Wire Mill Equipment, Layout and Practice
43 Midland St., Worcester, Mass.
Phone: Worcester 5-6033

WIRE MACHINERY SPECIALISTS
3—Nilson No. 1, 3 & 4 4 Slide Wire Machines
2—Baird No. 3 & S3F 4 Slide Wire Machines
7—Waterbury Step Cone Wire Drawing Machines
1—Two Spindle Bull Block Motor Driven
6—Lewis Welding Wire S & C Machines M. D.
2—Shuster Shaped Wire S & C Machines ½" & ⅞"
8—Shuster Round Wire S & C Machines 1/32"-¼"
Wanted: Tack Making Machinery All Sizes.
NATIONAL MACHINERY EXCHANGE
128-138 MOTT ST. NEW YORK, N. Y.

BRODEN
Wire Mill and Cold Rolling Equipment
Broden Construction Co.
11730 Harvard Ave.
CLEVELAND, OHIO

Wire Measuring Machines
For accurate lineal measuring of bare and insulated wire and cable .005 in. dia. up. Braiding Machine Counters.
DURANT MFG. CO.
1918 N. Buffum St. Milwaukee, Wis.
176 Eddy St. Providence, R. I.
Productimeters

TANKS
FOR EVERY MILL OPERATION
CLEANING—PICKLING—PLATING.
LEAD LINING RUBBER LINING
THE HAUSER-STANDER TANK CO.
CINCINNATI, OHIO

ZINC WIRE
THE PLATT BROS. & CO.
WATERBURY, CONN.

Designers and Builders of Gas-Fired Heat Treating Furnaces for Ferrous and Non-Ferrous Wire.
SURFACE COMBUSTION CORPORATION
Main Plant and General Offices—Toledo, Ohio

RUESCH
Machinery For
Wire, Tube, And Brass Mills
409 Mulberry St., Newark, N. J.

DIAMOND CARBIDE
DIES
KELLY
WIRE DIE CORPORATION
19 W. 34th St. New York

WIRE DRAWING MACHINERY AND EQUIPMENT
Rod Frames — 16" Frames, 8" Frames — Take-Up Frames, Wire Pointers—Puller Tongs.
General Castings for Wire Mill use.
Circulars on Request.
E. J. SCUDDER FOUNDRY & MACHINE CO.
TRENTON, N. J.

FOR DIAMOND AND CARBIDE WIRE DRAWING DIES SEE
RUSCH WIRE DIE CORPORATION
275 Seventh Ave., New York, N. Y.

Wire Drawing Diamond Dies
COCHAUD
WIRE DIE CORPORATION
300 W. 56th St., NEW YORK
Tel. Col. 5-1340

1939 Developments in Industrial Heating Equipment

(*Continued from Page 153*)

oven with top and bottom sheaves and automatic temperature control, a motor-driven take-off reeling mechanism, and supply racks for holding the spools of wire.

✦ ✦ ✦

WHEN enameling wire sizes from No. 23 to 30 gage 16 spools feed bare wire into the oven. Since the wire travels up and down until it has received 6 dips there are actually 96 strands in the oven at one time. Such an oven will enamel approximately 1000 ft. of No. 30 gage wire per minute. Of course, production varies with wire size—the larger the diameter of the wire, the slower the speed.

✦ ✦ ✦

Electric Furnaces for Sintering

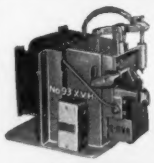
POWDER metallurgy commonly requires the sintering of parts made of pressed powdered metals at elevated temperatures in a controlled atmosphere. A new mesh-belt conveyor-type electric furnace has been produced for such work. Suitable for operating temperatures up to 2100 F., the heating chamber is equipped with heavy nickel-chromium rolled-ribbon resistors. Work is loaded on light pans which are carried through the furnace on a woven wire belt. After sintering in the heating chamber, the work travels through an adjoining water-jacketed cooling chamber, where the parts cool in protective atmosphere. One furnace recently installed is rated 102 kw, and has door opening 12 inches wide by 8 inches high, heating chamber 10 ft. long, cooling chamber 20 ft. long. Several standard sizes of furnaces of various types—box-, mesh-belt-, and roller-hearth-type — are available for sintering. The type chosen generally depends upon the rate of production—the box type for the lowest and the roller-hearth type for the highest production rates.

ROYLE
PATERSON N J
BUILDING EXTRUDERS SINCE 1880
Insulating Machinery for Western Electric Continuous Vulcanizing process.
JOHN ROYLE & SONS
PATERSON, N. J.
British Agency: James Day (Machinery) Ltd., Sentinel House, Southampton Row, London, W. C. 1, England

SCOTT TESTERS
For WIRE, RUBBER, TEXTILES, PAPER, Etc.
HENRY L. SCOTT CO.
PROVIDENCE, R. I.

MANUFACTURERS OF
WIRE BRAIDING — SPOOLING — TAPING
WINDING AND SPECIAL MACHINES
SINFRA WIRE COVERING MACHINES
FIDELITY MACHINE CO.
3908-18 Frankford Ave., Phila., Pa.

JLE AUTOMATIC COILING EQUIPMENT JLE
276,000 feet of CODE WIRE per day (8 hours) per Operator in 500 foot coils with two ties.
JAMES L. ENTWISTLE
88 PLEASANT ST. PAWTUCKET, R. I.


We manufacture Electric Spot Welders from ¼ to 500 K.V.A. We also make standard and special Transformers of all kinds. A.C. Arc Welders from 100 to 400 Amps.
Eisler Engineering Co.
CHAS. EISLER, Pres.
764 So. 13th St. (Near Avon Ave.)
Newark, New Jersey

WIRE, WIRE ROPE AND ELECTRIC CABLE MACHINERY
THOMSON-JUDD WIRE MACHINERY COMPANY
SUBSIDIARY OF
THOMSON-GIBB ELECTRIC WELDING COMPANY
LYNN, MASSACHUSETTS
WRITE FOR CATALOGUE

UNIVERSAL WIRE REEL
Quickly and easily adjusted to any angle within 90 degrees. Cut shows one angle.
Write for circular R
THE F. B. SHUSTER CO.
New Haven, Conn.
Straightener Specialists Since 1866

Index to Advertisers

A

American Chemical Paint Co. 182
American Insulating Machinery Co. 180
American Lanolin Co. 181
American Monorail Co. 171
Apco-Mossberg Co. 179

B

Balloffet Dies & Nozzle Co., Inc. 182
Bethlehem Steel Corp. 138
Broden Construction Co. 183

C

Carl-Mayer Corp., The 177
Carboloy Company, Inc. 137
Cleveland Tramrail Div. of Cleveland Crane & Eng. Co. 169
Cochaud Wire Die Corp. 184
Continental Steel Corp. 165

D

Durant Mfg. Co. 183

E

Eisler Engineering Co., Inc. 184
Electric Furnace Co., The ..... Back Cover
Entwistle, Jas. L. 184

F

Fidelity Machine Co. 184
Firth-Sterling Steel Co. 146

G

Glader, Wm., Machine Works 180

H

Hallden Machine Co., The 183
Hartley, Geo. D. 183
Hayward Co., R. B. 179
Hauser-Stander Tank Co., The 183
Hudson Wire Company 140
Hy-Carbo Steel Co. 183

K

Kelly Wire Die Corp. 184
Keystone Steel & Wire Co. 167

L

Lancaster, Allwine & Rommel 181
Lee Wilson Engineering Co. ..... Inside Front Cover
Lewis, K. B. 183
Lewis Machine Co., The 180

M

Magnus Chemical Co. 179
Micro Products Corp. 164
Miller, R. H., Co. 181
Morgan Construction Co. 144
Morrison Engineering Corp. 168
Moslo Machinery, Inc. 176
Mossberg Pressed Steel Corp. 170

N

National Machinery Exchange 183
National Oil Products Co. 182
National Rubber Machinery Co. 172
New England Butt Co. 183
Norton Company 176

P

Platt Brothers & Co. 184

R

Reactive Wire Drawing 175
Robertson, John, Co., Inc. 166
Royle, John, & Sons 184
Ruesch Machine Co., H. J. 184
Rusch Wire Die Corp. 184

S

Scott, H. L., Co. 184
Scudder Foundry & Machine Co., E. J. 184
Seymour Mfg. Co. 141
Shuster, F. B., Co., The 184
Sleeper & Hartley, Inc. 156
Standard Industrial Compounds Co. 178
Standard Machinery Co. 175
Stevens Metal Products Co. 145
Surface Combustion Corp. 184
Syncro Machine Co. 173

T

Thomson-Judd Wire Machinery Co. 184
Torrington Manufacturing Co., The 143

V

Vascoloy-Ramet Corp. 139
Vaughn Machinery Co., The ..... Front Cover
Vianney Wire Die Works 183

W

Warner Bros. 177
Watson Machine Co., The 174
Wayne Wie Die Co., Inc. 180
Willey's Carbide Tool Co. 179

THE ANNUAL MEDAL AWARD

OF THE

WIRE ASSOCIATION

FOR THE MOST MERITORIOUS PAPER ON
WIRE MANUFACTURE OR FABRICATION DURING THE YEAR

ALL members of the Wire Association are cordially invited to submit technical papers either for publication in "WIRE & WIRE PRODUCTS" during the year or for presentation before the Annual Wire Association Meeting at Cleveland, October 21-25, 1940.

✦ ✦ ✦

FOR 1940 and subsequent years a medal will be awarded in each of the two major divisions of the activities of the Association, to the papers coming nearest to the requirement set forth above.

✦ ✦ ✦

CONSIDERATION for the Medal Awards is not limited to the papers presented at the Annual Meeting, but is given to all papers submitted by members and published in "WIRE & WIRE PRODUCTS" during the year.

✦ ✦ ✦

SELECTION of papers to be presented at the Annual Convention rests in the hands of the Joint Programme Committee of the Wire Association.

✦ ✦ ✦

ALL papers submitted become the property of the Wire Association, and the Board of Directors constitutes the Committee on Awards.

✦ ✦ ✦

ADDITIONAL information may be obtained by addressing:

RICHARD E. BROWN,
SECRETARY, THE WIRE ASSOCIATION
STAMFORD TRUST CO. BLDG., STAMFORD, CONNECTICUT

WHERE TO BUY

For more complete information, consult the annual Directory, Index & Buyers' Guide.

ABRASIVES—
Norton Co., Worcester, Mass.

AIR DRAW FURNACES—
Carl-Mayer Corp., The, Cleveland, Ohio.

ANNEALING POTS AND BOXES—
Scudder, E. J. Fdry. & Machine Co., Trenton, N. J.

ANODES—Nickel
Seymour Mfg. Co., Seymour, Conn.

ANTI-RUST—Compound
Magnus Chemical Co., Garwood, N. J.
National Oil Products Co., Harrison, N. J.

ARMORING EQUIPMENT—
American Insulating Mach'y. Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Watson Machine Co., Paterson, N. J.

AUTOMATIC SPARK TESTING EQUIPMENT—
Entwistle, James L., Pawtucket, R. I.

BAKERS—Flash
Morrison Engineering Corp., Cleveland, O.

BAKERS—Hi-Speed
Carl-Mayer Corp., The, Cleveland, Ohio.

BAKERS—Rod and Wire
Carl-Mayer Corp., The, Cleveland, O.
Morgan Construction Co., Worcester, Mass.
Morrison Engineering Corp., Cleveland, O.
Moslo Machinery, Inc., Cleveland, O.

BOBBINS—Braider and Wire Weaving
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.

BORON CARBIDE—
Norton Co., Worcester, Mass.

CARRIERS—Braider, High Speed
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.

CEMENT FLOOR CLEANER—
Magnus Chemical Co., Garwood, N. J.

CEMENTS—Refractory
Norton Co., Worcester, Mass.

CHEMICALS—Cleaning
American Chemical Paint Co., Ambler, Pa.
Magnus Chemical Co., Garwood, N. J.
Standard Industrial Compounds Co., Chicago, Ill.

CLEANERS—Hand and Metal
Magnus Chemical Co., Garwood, N. J.

CLEANING & PICKLING EQUIPMENT—
Broden Construction Co., Cleveland, O.
Cleveland Tramrail div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Hauser-Stander Tank Co., Cincinnati, O.
Lee-Wilson Engineering Co., Cleveland, Ohio
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

CLOTH TESTERS—
Scott, Henry L., Co., Providence, R. I.

COATING—Protective
American Lanolin Corp., Lawrence, Mass.
National Oil Products Co., Harrison, N. J.

COILERS—Sheet, Strip and Wire
Broden Construction Co., Cleveland, O.
H. J. Ruesch Machine Co., Newark, N. J.
Torrington Mfg. Co., The, Torrington, Conn.

COILERS AND SPOOLERS FOR INSULATED WIRES—
Entwistle, James L., Pawtucket, R. I.

COMPOUNDS—Wire Drawing
Magnus Chemical Co., Garwood, N. J.
National Oil Products Co., Harrison, N. J.
Standard Industrial Compounds Co., Chicago, Ill.

COPHOLDERS—Steel
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.

CRANES—Wire Mill
American Monorail Co., Cleveland, O.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, O.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

CUSTOM WIRE DRAWING—
Hy-Carbo Steel Co., Lowell, Mass.

CUTTING TOOLS—Carbide
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Vascoloy-Ramet Corp., North Chicago, Ill.

DIAMOND POWDERS—
Rusch Wire Die Corp., New York, N. Y.

DIAMOND TOOLS—
Rusch Wire Die Corp., New York, N. Y.

DIES—Diamond
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Cochaud Wire Die Co., New York, N. Y.
Kelly Wire Die Corp., New York, N. Y.
Rusch Wire Die Corp., New York, N. Y.
Vianney Wire Die Works, New York, N. Y.
Wayne Wire Die Co., Inc., Irvington, N. J.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Lead Extrusion
John Robertson Co., Brooklyn, N. Y.

DIES—Repairs & Re-Cutting
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Carboloy Co., Inc., Detroit, Mich.
Cochaud Wire Die Co., New York, N. Y.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Rusch Wire Die Corp., New York, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Works, New York, N. Y.
Wayne Wire Die Co., Inc., Irvington, N. J.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Rod and Tube Drawing
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Rusch Wire Die Corp., New York, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Works, New York, N. Y.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Tantalum Carbide
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Rusch Wire Die Corp., New York, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Works, New York, N. Y.

DIES—Tungsten Carbide
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Rusch Wire Die Corp., New York, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Works, New York, N. Y.
Willey's Carbide Tool Co., Detroit, Mich.

DRAW BENCHES—
H. J. Ruesch Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Machine Co., Trenton, N. J.
Standard Machinery Co., Providence, R. I.
Vaughn Machinery Co., Cuyahoga Falls, O

DRUMS—Flange Steel
Stevens Metal Products Co., Niles, O.

DRUMS—Vulcanizing
Mossberg Pressed Steel Corp., Attleboro, Mass.

ENGINEERS—Consulting Wire Mill
Hartley, George D., Worcester, Mass.
Lewis, Kenneth B., New York, N. Y.

EQUIPMENT—Insulation Testing
Entwistle, James L., Pawtucket, R. I.

EYELETS—Brass or Zinc
Platt Bros. & Co., The, Waterbury, Conn.

FLASH BAKERS—
Morrison Engineering Corp., Cleveland, O.

FURNACES—Annealing
Carl-Meyer Corp., The, Cleveland, O.
Electric Furnace Co., Salem, O.
Lee-Wilson Engineering Co., Cleveland, Ohio
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Automatic
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, O.
Lee-Wilson Engineering Co., Cleveland, Ohio
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Brazing
Electric Furnace Co., Salem, O.
Firth-Sterling Steel Co., McKeesport, Pa.

FURNACES—Bright Annealing
Electric Furnace Co., Salem, O.
Lee-Wilson Engineering Co., Cleveland, Ohio
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Electric
Electric Furnace Co., Salem, O.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Galvanizing
Lee-Wilson Engineering Co., Cleveland, Ohio

FURNACES—Hardening and Tempering
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, O.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Lead Melting
Electric Furnace Co., Salem, O.
John Robertson Co., Brooklyn, N. Y.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Non-Oxidizing
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, O.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Normalizing
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, O.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Salt Bath
Electric Furnace Co., Salem, O.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Wire, Strip & Sheet
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, O.
Lee Wilson Engineering Co., Cleveland, O.
Morrison Engineering Corp., Cleveland, O.
Surface Combustion Corp., Toledo, Ohio.

GALVANIZING EQUIPMENT—
Lee-Wilson Engineering Co., Cleveland, Ohio

GRINDERS—ROLL
Norton Co., Worcester, Mass.

HI-SPEED BAKERS—
Carl-Mayer Corp., Cleveland, O.

HOISTS—Electric Traveling
American Monorail Co., Cleveland, O.
Cleveland Tramrail div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio.

INHIBITORS—
American Chemical Paint Co., Ambler, Pa.
National Oil Products Co., Harrison, N. J.

INSTRUMENTS—Electrical
Entwistle, James L., Pawtucket, R. I.

LATHES—Die Reaming
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

LIME—
Warner Co., The, Bellefonte, Pa.

LUBRICANTS—For Metal Cutting, Stamping and Drawing
Magnus Chemical Co., Garwood, N. J.
Miller Co., R. H., Homer, N. Y.
National Oil Products Co., Harrison, N. J.
Standard Industrial Compounds Co., Chicago, Ill.

LUBRICANTS—Wire Drawing
Magnus Chemical Co., Garwood, N. J.
Miller Co., R. H., Homer, N. Y.
National Oil Products Co., Harrison, N. J.
Standard Industrial Compounds Co., Chicago, Ill.

MACHINERY—Armoring (Cable, Wire Hose)
American Insulating Mach'y. Co., Phila., Pa.
New England Butt Co., Providence, R. I.
John Robertson Co., Brooklyn, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Braiding
Fidelity Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Brazing
Thomson-Judd Wire Machinery Co., Lynn, Mass.

MACHINERY—Bunching
American Insulating Mach'y. Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Bundling, Scrap
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.

WHERE TO BUY, Continued

MACHINERY—Cable, Electric
American Insulating Mach'y. Co., Phila., Pa.
Entwistle, James L., Pawtucket, R. I.
Fidelity Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Rahway, N. J.
Thomson-Gibb Electric Welding Co., Lynn, Mass.
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Chain Making
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Closing
New England Butt Co., Providence, R. I.
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Coil Winding
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Coilers
Broden Construction Co., Cleveland, O.
Entwistle, James L., Pawtucket, R. I.
Morgan Construction Co., Worcester, Mass.
New England Butt Co., Providence, R. I.
H. J. Ruesch Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Copper Wire Drawing and Rolling
H. J. Ruesch Machine Co., Newark, N. J.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Covering Wire
Fidelity Machine Co., Philadelphia, Pa.
Syncro Machine Co., Rahway, N. J.

MACHINERY—Cutting
Broden Construction Co., Cleveland, O.
Hallden Machine Co., Thomaston, Conn.
Lewis Machine Co., The, Cleveland, O.
Moslo Machinery Inc., Cleveland, O.
National Machinery Exchange (Used), New York, N. Y.
F. B. Shuster Co., New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.

MACHINERY—Die Making
Firth-Sterling Steel Co., McKeesport, Pa.

MACHINERY—Edging
Standard Machinery Co., Providence, R. I.

MACHINERY—Enameling
American Insulating Mach'y. Co., Phila., Pa.
Syncro Machine Co., Rahway, N. J.

MACHINERY—Extruding
John Robertson Co., Brooklyn, N. Y.
Royle, John & Sons, Paterson, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Flat Wire
Broden Construction Co., Cleveland, O.
H. J. Ruesch Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Forming
National Machinery Exchange (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Galvanizing
Lee-Wilson Engineering Co., Cleveland, Ohio

MACHINERY—Galvanizing Wire
Broden Construction Co., Cleveland, O.
Lee Wilson Engineering Co., Cleveland, Ohio.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Gang Winders
Fidelity Machine Co., Philadelphia, Pa.
H. J. Ruesch Machine Co., Newark, N. J.
Syncro Machine Co., Rahway, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Grinding
Norton Co., Worcester, Mass.

MACHINERY—Insulating
American Insulating Mach'y. Co., Phila., Pa.
Fidelity Machine Co., Philadelphia, Pa.
National Rubber Machinery Co., Akron, O.
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Syncro Machine Co., Rahway, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Knitting
Fidelity Machine Co., Philadelphia, Pa.

MACHINERY—Lead Encasing
John Robertson Co., Brooklyn, N. Y.

MACHINERY—Lead Stripping
John Robertson Co., Brooklyn, N. Y.
Watson Machine Co., Paterson, N. J.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Magnet Wire
American Insulating Mach'y. Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Material Handling
American Monorail Co. Cleveland, O.
Cleveland Tramrail div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio.

MACHINERY — Measuring Wire & Cable
Durant Mfg. Co., Milwaukee, Wis.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Nail and Tack
Glader, Wm., Machine Works Co., Chicago, Ill.
National Machinery Exchange (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Panning
American Insulating Mach'y. Co., Phila., Pa.
Syncro Machine Co., Rahway, N. J.

MACHINERY—Pointing
Broden Construction Co., Cleveland, O.
H. J. Ruesch Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Rod Mill
Broden Construction Co., Cleveland, O.
Morgan Construction Co., Worcester, Mass.
H. J. Ruesch Machine Co., Newark, N. J.

MACHINERY—Rolling Mill
Broden Construction Co., Cleveland, O.
Morgan Construction Co., Worcester, Mass.
National Machinery Exchange (Used), New York, N. Y.
H. J. Ruesch Machine Co., Newark, N. J.
Standard Machinery Co., Providence, R. I.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Rubber for Insulating Wire
National Rubber Machinery Co., Akron, O.
Royle, John & Sons, Paterson, N. J.

MACHINERY—Rubber Strip Covering
National Rubber Machinery Co., Akron, O.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Rubber Tubing and Straining
National Rubber Machinery Co., Akron, O.
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Screw Wire
National Machinery Exchange (Used), New York, N. Y.
Sleeper & Hartley, Worcester, Mass.

MACHINERY—Special
American Insulating Mach'y. Co., Phila., Pa.
Broden Construction Co., Cleveland, O.
National Rubber Machinery Co., Akron, O.
New England Butt Co., Providence, R. I.
H. J. Ruesch Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Spooling
American Insulating Mach'y. Co., Phila., Pa.
Fidelity Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.

MACHINERY—Spring Making
National Machinery Exchange (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Staple
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Straightening
Broden Construction Co., Cleveland, O.
Hallden Machine Co., Thomaston, Conn.
Lewis Machine Co., The, Cleveland, O.
Moslo Machinery, Inc., Cleveland, O.
National Machinery Exchange (Used), New York, N. Y.
H. J. Ruesch Machine Co., Newark, N. J.
F. B. Shuster, New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Stranding
National Rubber Machinery Co., Akron, O.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Strip Steel
Broden Construction Co., Cleveland, O.
H. J. Ruesch Machine Co., Newark, N. J.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Swaging
National Machinery Exchange (Used), New York, N. Y.
H. J. Ruesch Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Providence, R. I.
Syncro Machine Co., Rahway, N. J.

MACHINERY—Taping
American Insulating Mach'y. Co., Phila., Pa.
Fidelity Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Rahway, N. J.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Testing
Entwistle, James L., Pawtucket, R. I.
Scott, Henry L., Co., Providence, R. I.

MACHINERY—Testing Size of Wire
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Testing—Spring
Standard Machinery Co., Providence, R. I.

MACHINERY—Tinsel Rolling Mills
American Insulating Mach'y. Co., Phila., Pa.
Syncro Machine Co., Rahway, N. J.

MACHINERY—Trolley Wire
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill
H. J. Ruesch Machine Co., Newark, N. J.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Welding Wire
Eisler Engineering Co., Inc., Newark, N. J.
Micro Products Co., Chicago, Ill.
F. B. Shuster Co., New Haven, Conn.
Thomson-Judd Wire Machinery Co., Lynn, Mass.

MACHINERY—Winding
American Insulating Mach'y. Co., Phila., Pa.
Entwistle, James L., Pawtucket, R. I.
Fidelity Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Drawing
American Insulating Mach'y. Co., Phila., Pa.
Broden Construction Co., Cleveland, O.
Morgan Construction Co., Worcester, Mass.
National Machinery Exchange (Used), New York, N. Y.
Reactive Wire Drawing, Worcester, Mass.
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Torrington Mfg. Co., The, Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Wire Measuring
Durant Mfg. Co., Milwaukee, Wis.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Rope
National Rubber Machinery Co., Akron, O.
New England Butt Co., Providence, R. I.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Watson Machine Co., Paterson, N. J.

WHERE TO BUY, Continued

MACHINERY—Wire Tinning
American Insulating Mach'y. Co., Phila., Pa.
New England Butt, Co., Providence, R. I.
Syncro Machine Co., Rahway, N. J.

MACHINERY—Wood Screw
National Machinery Exchange (Used), New York, N. Y.

MATERIAL HANDLING EQUIPMENT—
American Monorail Co., Cleveland, O.
Cleveland Tramrail div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio.

MILLS—Tandem Rolling and Edging
Standard Machinery Co., Providence, R. I.
Torrington Mfg. Co., The, Torrington, Conn.

NICKEL SILVER AND PHOSPHOR BRONZE—Rod, Wire and Strip
Hudson Wire Co., Ossining, N. Y.
Seymour Mfg. Co., Seymour, Conn.

OILS—Wire Drawing
National Oil Products Co., Harrison, N. J.
Standard Industrial Compounds Co., Chicago, Ill.

OVENS—Industrial
Carl-Mayer Corp., Cleveland, Ohio.
Morrison Engineering Corp., Cleveland, O.

PANS—Vulcanizing
Mossberg Pressed Steel Corp., Attleboro, Mass.

PAPER TESTERS—
Scott, Henry L., Co., Providence, R. I.

PATENT ATTORNEYS—
Lancaster, Allwine and Rommel, Washington, D. C.

PICKLING COMPOUNDS
American Chemical Paint Co., Ambler, Pa.
National Oil Products Co., Harrison, N. J.

PLASTIC TESTERS—
Scott, Henry L., Co., Providence, R. I.

POTS—Lead Melting
John Robertson Co., Brooklyn, N. Y.

PRESSES—Hydraulic and Mechanical
John Robertson Co., Brooklyn, N. Y.
Standard Machinery Co., Providence, R. I.

PRESSES—Lead
John Robertson Co., Brooklyn, N. Y.

PULLERS—Wire
Scudder, E. J., Fdry. & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.

PUMPS—Hydraulic
John Robertson Co., Brooklyn, N. Y.

REACTIVE WIRE DRAWING
Reactive Wire Drawing, Worcester, Mass.

RECORDERS—Fault and Reel
Entwistle, James L., Pawtucket, R. I.

REEL AND TENSION STAND—
Fidelity Machine Co., Philadelphia, Pa.
Moslo Machinery, Inc., Cleveland, O.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.

REEL CRUTCHES—
Watson Machine Co., Paterson, N. J.

REELS—Annealing and Stranding
Apco Mossberg Co., Attleboro, Mass.
Moslo Machinery, Inc., Cleveland, O.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Shuster Co., F. B., New Haven, Conn.
Stevens Metal Products Co., Niles, O.

REELS—Steel
Apco Mossberg Co., Attleboro, Mass.
Hayward Co., R. B., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

REELS AND SPOOLS—Shipping and Shop
Apco Mossberg Co., Attleboro, Mass.
Hayward Co., R. B., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

REELS—Takeoff
Apco Mossberg Co., Attleboro, Mass.
Hayward Co., R. B., Chicago, Ill.
Moslo Machinery Inc., Cleveland, O.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Shuster, F. B. Co., New Haven, Conn.
Stevens Metal Products Co., Niles, O.

REELS—Vulcanizing and Impregnating
Apco Mossberg Co., Attleboro, Mass.
Hayward Co., R. B., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Shuster, F. B. Co., New Haven, Conn.
Stevens Metal Products, Co., Niles, O.

REELS—Wire Drawing
Apco Mossberg Co., Attleboro, Mass.
Hayward Co., R. B., Chicago, Ill.
Moslo Machinery, Inc., Cleveland, O.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products, Co., Niles, O.

REFRACTORIES—High Temperature
Norton Co., Worcester, Mass.

ROD BAKERS
Carl-Mayer Corp., The, Cleveland, O.
Morrison Engineering Corp., Cleveland, O.
Moslo Machinery, Inc., Cleveland, O.

RODS—Wire—Non-Ferrous
Hudson Wire Co., Ossining, N. Y.
Platt Bros. & Co., The, Waterbury, Conn.
Seymour Mfg. Co., Seymour, Conn.

RODS—Wire—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.

ROLL STRAIGHTENERS—
Moslo Machinery, Inc., Cleveland, O.

RUBBER AND RUBBER COMPRESSION TESTERS—
Scott, Henry L., Co., Providence, R. I.

RUST PROOF COMPOUND—
American Lanolin Co., Lawrence, Mass.

SHEET—Steel
Continental Steel Corp., Kokomo, Ind.

SKIN PROTECTOR—
Magnus Chemical Co., Garwood, N. J.

SOAPS—Industrial and Wire Drawing
Magnus Chemical Co., Garwood, N. J.
Miller, Co., R. H., Homer, N. Y.
National Oil Products Co., Harrison, N. J.
Standard Industrial Compounds Co., Chicago, Ill.

SPARK TESTING EQUIPMENT—
Entwistle, James L., Pawtucket, R. I.

SPOOLS—Annealing and Wire Drawing
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Chicago, Ill.

SPOOLS—Shipping and Shop
Apco Mossberg Co., Attleboro, Mass.
Hayward Co., R. B., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

SPOOLS—Steel
Apco Mossberg Co., Attleboro, Mass.
Hayward Co., R. B., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

STAMPINGS—Steel
Mossberg Pressed Steel Corp., Attleboro, Mass.

STRIP—Brass and Non Ferrous
Hudson Wire Co., Ossining, N. Y.
Seymour Mfg. Co., Seymour, Conn.

STRIP—Steel
Bethlehem Steel Corp., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel Co., McKeesport, Pa.

STRIP METAL TESTERS—
Scott, Henry L., Co., Providence, R. I.

SWIFTS—Take-off
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.

TAKE-UPS FOR CABLE, HOSE, LEAD PRESSES AND SHEET RUBBER—
Entwistle, James L., Pawtucket, R. I.

TANKS—Acid
Hauser-Stander Tank Co., Cincinnati, O.

TANKS—Compound
Watson Machine Co., Paterson, N. J.

TANKS—Lead Lined
Hauser-Stander Tank Co., Cincinnati, O.

TANKS—Pickling
Hauser-Stander Tank Co., Cincinnati, O.

TANKS—Rubber Lined
Hauser-Stander Tank Co., Cincinnati, O.

TANKS—Steel
Mossberg Pressed Steel Corp., Attleboro, Mass.

TANKS—Wooden
Hauser-Stander Tank Co., Cincinnati, O.

TENSILE TESTERS—
Scott, Henry L., Co., Providence, R. I.

TESTING INSTRUMENTS—
Entwistle, James L., Providence, R. I.
Scott Co., Henry L., Providence, R. I.

TRAMRAIL SYSTEMS—
Cleveland Tramrail div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio.

TREADS—Safety
Norton Co., Worcester, Mass.

TRUCKS—
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

TUBE BENDERS AND FORMERS—
H. J. Ruesch Machine Co., Newark, N. J.

TURKS HEAD—
Standard Machinery Co., Auburn, R. I.

VULCANIZERS—
Watson Machine Co., Paterson, N. J.

VULCANIZING PANS—
American Insulating Mach'y. Co., Phila., Pa.

WELDERS—Spot and Butt
Eisler Engineering Co., Newark, N. J.
Micro Products Co., Chicago, Ill.
Moslo Machinery, Inc., Cleveland, O.

WIRE—Cold Heading
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.

WIRE DRAWING—High Grade Custom
Hy-Carbo Steel Co., Lowell, Mass.

WIRE—Electric
Hudson Wire Co., Ossining, N. Y.
Seymour Mfg. Co., Seymour, Conn.

WIRE—Enameled For Coils
Winsted Div. of Hudson Wire Co., Winsted, Conn.

WIRE—Manufacturers
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel Co., McKeesport, Pa.
Keystone Steel & Wire Co., Peoria, Ill.

WIRE—Nickel Silver and Phosphor Bronze
Hudson Wire Co., Ossining, N. Y.
Seymour Mfg. Co., Seymour, Conn.

WIRE—Non Ferrous to Specification For Special Purposes
Hudson Wire Co., Ossining, N. Y.
Seymour Mfg. Co., Seymour, Conn.
Winsted Div. of Hudson Wire Co., Winsted, Conn.

WIRE—Spring
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel Co., McKeesport, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Seymour Mfg. Co., Seymour, Conn.

WIRE—Stainless Steel
Firth-Sterling Steel Co., McKeesport, Pa.

WIRE—Steel—Also Coppered Steel——Also Galvanized Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.

WIRE AND STRIP—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

WIRE TESTERS—
Scott, Henry L., Co., Providence, R. I.

WIRE, WEAVING—Non Ferrous
Hudson Wire Co., Ossining, N. Y.

YARN TESTERS—
Scott, Henry L., Co., Providence, R. I.

THE WIRE ASSOCIATION

WHAT IT GIVES YOU FOR $10.00 ANNUAL DUES

I. WIRE & WIRE PRODUCTS — For One Year.

The official publication of The Wire Association, covering the Wire Industry; its Metallurgy, Technology, Research, Processes, Machinery and Personnel.

Regular Subscription — $5.00 in U. S.
$7.50 Foreign.

II. THE ANNUAL BUYERS GUIDE AND YEAR BOOK OF THE WIRE ASSOCIATION.

A complete Directory of the Wire Industry, with alphabetical listings of its Products, Machinery and Raw Materials. Gives the source of all Supplies and Equipment used in both the Manufacture of Wire and Rod, and Wire Products produced therefrom.

The Year Book Section contains: Constitution and By-laws of The Wire Association; Details of year's meetings, etc; List of Members, Index to Papers and Articles in WIRE AND WIRE PRODUCTS.

Regular Sales Price — $5.00.

III. QUESTION AND ANSWER SERVICE.

This extremely valuable service to members answers Technical and Operating Problems both in WIRE AND WIRE PRODUCTS, and direct by mail if desired. Available to members without charge.

IV. ANNUAL CONVENTION AND EXHIBITION.

(In Association with American Society for Metals and The National Metal Congress.) Technical Sections, Plant Inspections.

V. REGIONAL MEETINGS.

Attendance at the Pittsburgh, Pa., and Worcester, Mass. meetings which include Local Plant Inspections, Technical Sessions and Discussions.

VI. PERSONAL CONTACTS.

Both at Annual and Regional Meetings, and throughout the year, for interchange of helpful information.

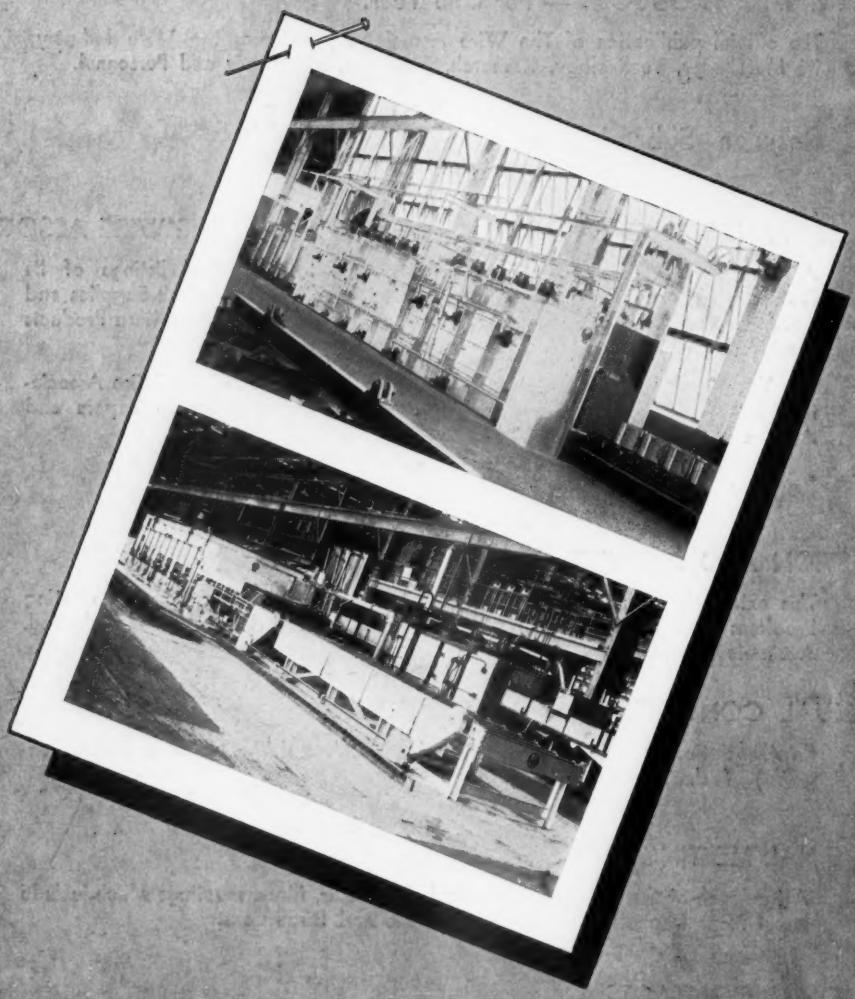
VII. INFORMATION SERVICE ON MACHINERY, EQUIPMENT AND SUPPLIES.

The Technical, Catalogue and Correspondence Files of the Wire Association hold the answer to practically every "Where can I buy" problem. This service is available to members without charge.

For Detailed Information Address

RICHARD E. BROWN,
EXECUTIVE SECRETARY

STAMFORD TRUST CO. BUILDING — STAMFORD, CONN.



The upper view shows another E. F. continuous fuel fired furnace recently installed for annealing large coils of both narrow and wide strip.

The lower view shows two more E. F. continuous furnaces for bright annealing tubing—one gas fired and one electric—operating side by side in another prominent plant. Each furnace doing an excellent job on the product and process for which it was designed.

We build furnaces for any heating or heat treating process, for any product or production. We have made some outstanding installations in prominent ferrous and non-ferrous wire plants. Permit us to work with you on your next furnace or heat treating problem.

The Electric Furnace Co., Salem, Ohio

Gas Fired, Oil Fired and Electric Furnaces---For Any Process, Product or Production